

A taxonomic revision of the spider genus *Perania* Thorell, 1890 (Araneae: Tetrablemmidae: Pacullinae) with the descriptions of eight new species

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A taxonomic revision of the spider genus *Perania* Thorell, 1890 (Araneae: Tetrablemmidae: Pacullinae) with the descriptions of eight new species. - Nineteen *Perania* species are recognized, keyed and attributed to five species-groups. Eight new species are described, *P. tumida*, *P. ferox*, *P. quadrifurcata* and *P. egregia* from northern, northwestern and northeastern Thailand, *P. utara*, *P. harau*, *P. deelemanae* and *P. selatan* from Sumatra. The female copulatory organs of *P. armata* (Thorell, 1890), *P. nigra* (Thorell, 1890), *P. picea* (Thorell, 1890) and *P. birmanica* (Thorell, 1898; known only from the holotype) are illustrated for the first time. *Perania armata*, type species of the monotypic genus *Mirania* Lehtinen, 1981, is shown to be the sister species of *P. nigra*, type species of *Perania*, and thus *Mirania* is kept in the synonymy of *Perania*. *Perania korinchica* Hogg, 1919 is removed from the synonymy of *P. picea* and re-described from a male collected at the type locality. New material of *P. robusta* Schwendinger, 1989, *P. nasuta* Schwendinger, 1989 and *P. siamensis* Schwendinger, 1994 from northern and southern Thailand, of *P. cerastes* Schwendinger, 1994 from peninsular Malaysia, and of *P. nigra*, *P. picea* and *P. armata* from Sumatra is presented. Two morphological forms are recognized for *P. cerastes*. Taxonomic characters and relationships are discussed; general information on the biology of some of these species is given.

Keywords: Southeast Asia - armoured spiders - *Mirania*.

INTRODUCTION

Perania is a genus of armoured spiders that construct irregular sheetwebs in humid forest in Southeast Asia. Although containing the largest representatives of the family Tetrablemmidae, *Perania* is rarely collected and still little known. Twelve nominal species have previously been described from eastern Myanmar, Thailand, peninsular Malaysia and Sumatra by Thorell (1890, 1898), Hogg (1919) and Schwendinger (1989, 1994), one of which (*P. robusta*, described from the northernmost tip of Thailand) was later also reported from southern China (Lian, 2009). Here males and females of eight additional species are described from the known range, and a female is reported (but not named) from northern Sumatra, together with juveniles from two Indonesian islands south of Singapore (see Fig. 1). The increasing numbers

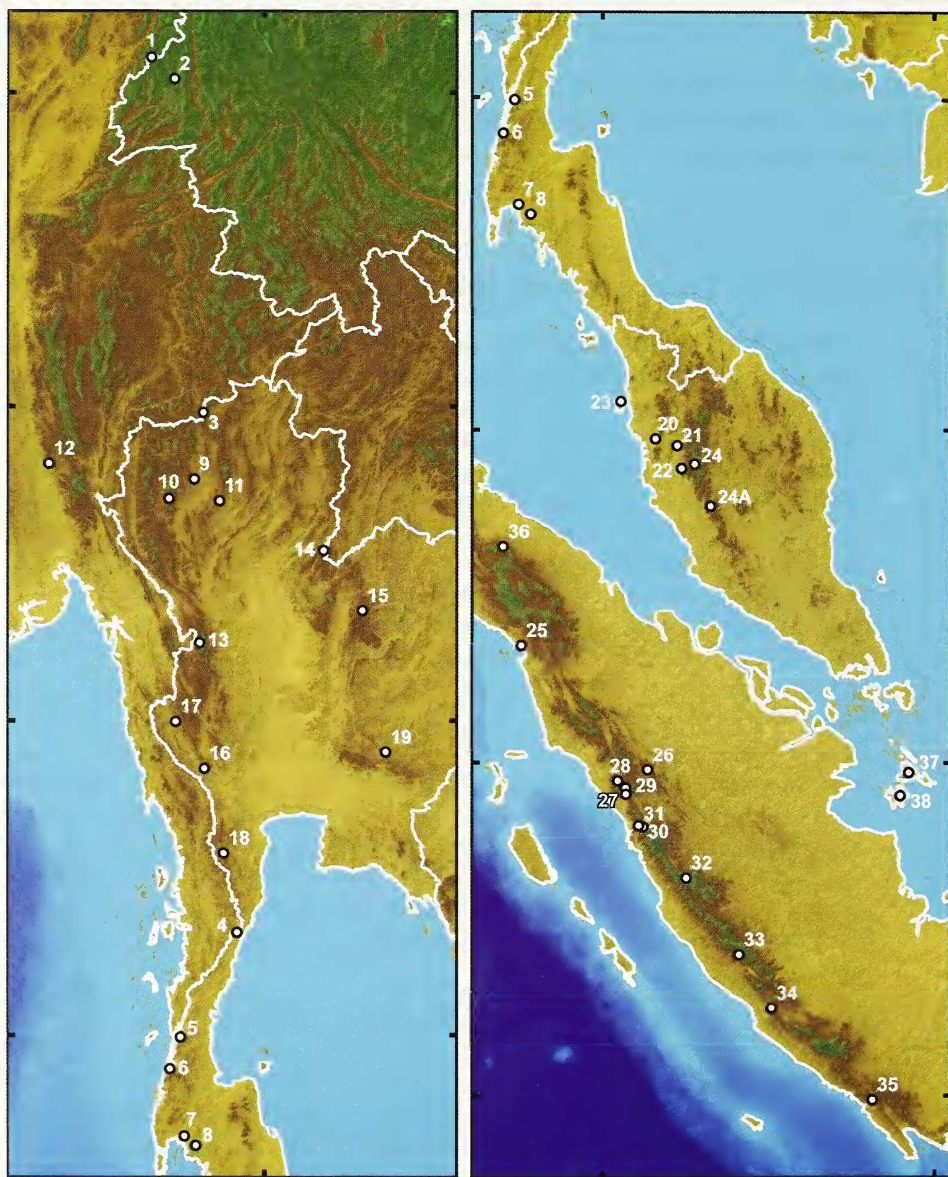


FIG. 1

Localities of *Perania* spp. roughly in order of appearance in the text. Left map: mainland Southeast Asia from southern China to southern Thailand; right map: Thai-Malaysian peninsula, Lingga Archipelago and central part of Sumatra. CHINA: 1 - Zhaobitang (*P. robusta*), 2 - Xiangyangqiao (*P. robusta*); THAILAND: 3 - Doi Angkhang (*P. robusta*), 4 - Huay Yang (*P. siamensis*), 5 - Ranong (*P. siamensis*), 6 - Khlong Nakha (*P. siamensis*), 7 - Thanboke Khoranee (*P. siamensis*), 8 - Khao Phanom Bencha (*P. siamensis*), 9 - Doi Suthep-Pui (*P. nasuta*), 10 - Doi Inthanon (*P. nasuta*), 11 - Doi Khuntan (*P. nasicornis*); MYANMAR: 12 - Bia-po (*P. birmanica*); THAILAND: 13 - Mae Sot - Umphang (*P. ferox* sp. n.), 14 - Phu Soi Dao (*P. tumida* sp. n.), 15 - Nam Nao (*P. egregia* sp. n.), 16 - Sai Yok Noi (*P. quadrifurcata* sp. n.),

of species, localities and specimens that have become known since the last comprehensive taxonomic treatment of the genus [as part of a monograph on the entire family by Lehtinen (1981)] justify a new revision.

MATERIAL AND METHODS

External morphology was studied and drawn using a Zeiss SV11 stereomicroscope, the vulvae (tissue removed with forceps and insect pins) using a Nikon Optiphot compound microscope (both with a drawing tube) and re-checked using a stereomicroscope. Body measurements were taken with a stereomicroscope and are given in millimetres. The total body length and the carapace length include the clypeal process, if present. The sternum length was measured between the midpoint of the anterior margin of the sternum and the posterior edge of the posterior sternal process; the sternum width between coxae II. Lengths of leg articles and palpal articles were measured on the dorsal side, from midpoint of anterior margin to midpoint of posterior margin, and are given in the following order: total (femur + patella + tibia + metatarsus + tarsus). The length of the pulmonary plate was measured from the lateral side. References to figures that are to different scales in the legend of each plate are separated by semicolons.

Terminology of somatic characters follows Lehtinen (1981), that of copulatory organs Schwendinger (1994). The informal appellation “allotype” refers to the paratype on which the description of the female of each new species is based. The term “carapace” is used instead of “dorsal plate of prosoma” or “holopeltidium”. The terms “long/short”, “wide/narrow” and “deep/shallow” always relate to the longitudinal axis of the spider body, limb or palpal organ.

All setae on the palps and on the carapaces, most cowpat-shaped tubercles and wart-like setal bases (some in anterior portion shown) on the carapaces are omitted in the illustrations.

In the dorsal view of the vulvae the ventral wall of the genital atrium (with or without pigmentation) is illustrated as it can be seen under the microscope through the thin, membranous and transparent dorsal wall of the genital atrium which may easily come off during preparation.

The order in which species within each species group are given is geographical, roughly from north to south. The GPS coordinates of Gua Kanthan and Gua Tempurung were taken from Platnick *et al.* (1997) and checked on Google Earth. None of the specimens examined have registration numbers.

17 - Daichongthong (*P. quadrifurcata* sp. n.), 18 - Kaeng Krachan (*P. quadrifurcata* sp. n.), 19 - Sakaerat (*P. quadrifurcata* sp. n.); MALAYSIA (peninsula): 20 - Maxwell's Hill (*P. cerastes*), 21 - Kanthan Cave (*P. cerastes*), 22 - Tempurung Cave (*P. cerastes*), 23 - Penang Hill (*P. cerastes*), 24 - Cameron Highlands (*P. coryne*), 24A - Fraser's Hill (*Perania* sp.); INDONESIA: 25 - Sibolga (*P. utara* sp. n.), 26 - Harau Canyon (*P. harau* sp. n.), 27 - Lembah Anai (*P. armata*), 28 - Lake Maninjau (*P. nigra*), 29 - Mt Singgalang (*P. nigra*, *P. armata*, *P. picea*), 30 - Lubuk Selasih (*P. armata*), 31 - Hutan Raya Bung Hatta (*P. armata*), 32 - Gunung Kerinci (*P. picea*, *P. korinchica*), 33 - Ketenong (*P. deelemanae* sp. n.), 34 - Taba Penanjung (*P. deelemanae* sp. n.), 35 - Liwa (*P. selatan* sp. n.), 36 - Brastagi (*Perania* sp.), 37 - Lingga Island (*Perania* sp.), 38 - Singkep Island (*Perania* sp.).

Abbreviations not explained in the figure legends are: ALE = anterior lateral eyes; MCSNG = Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy; MHNG = Muséum d'histoire naturelle de la Ville de Genève, Switzerland; MZT = Zoological Museum, University of Turku, Finland; NMP = National Museum, Prague, Czech Republic; PME = posterior median eyes; PLE = posterior lateral eyes; SMF = Senckenberg Museum, Frankfurt, Germany.

TAXONOMY

Perania Thorell, 1890

Perania Thorell, 1890: 315; type species by original designation and monotypy, *P. pallida* Thorell, 1890 [formally placed in the synonymy of *Perania nigra* (Thorell, 1890) by Lehtinen, 1981: 15].

Mirania Lehtinen, 1981: 16-17; type species by designation and by monotypy, *Phaedima armata* Thorell, 1890; *Mirania* placed in the synonymy of *Perania* by Schwendinger, 1989: 579.

REMARKS: There is some confusion about which is the valid type species of *Perania*. Bourne (1980: 259) was the first to note that the juvenile holotype of *Perania pallida* (the originally designated type species of *Perania*) is probably conspecific with either *Phaedima picea* Thorell, 1890 or *Phaedima nigra* Thorell, 1890 (both latter species at that time in *Paculla* Simon, 1887, now in *Perania*). On page 250 of the same paper Bourne more specifically suggested that *P. pallida* is conspecific with *P. nigra*, but on page 254 he explicitly gave *P. picea* as the type species "Type species of the genus: *Perania picea* (Thorell, 1890)". Lehtinen (1981: 15) was more decisive about this and placed *P. pallida* in the synonymy of *P. nigra*. The type locality of all three nominal species is Mt Singgalang. As the new specimens of *P. nigra* were found quite close to Mt Singgalang, and new specimens of *P. picea* much further away, it is possible that an incorrect locality was given for the types of *P. picea*. Thus it appears more likely that the type of *P. pallida* is conspecific with the types of *P. nigra*. I therefore follow Lehtinen's decision.

Phaedima Thorell, 1881 (type species *Phaedima granulosa* Thorell, 1881) is a junior homonym of *Phaedima* Robineau-Desvoidy, 1863 in the Diptera. Simon (1887: 194) replaced the name *Phaedima* Thorell, 1881 with *Paculla* Simon, 1887 and later (1894: 573) explicitly transferred all corresponding species. These included *Phaedima granulosa*, *armata*, *P. nigra* and *P. picea*, but not *Perania pallida*. *Paculla granulosa* is still in that combination. *Paculla picea* and *Paculla nigra* were transferred to *Perania* by Bourne (1980: 254, 256) and by Lehtinen (1981: 16, 15); *Paculla armata* was transferred to *Mirania* by Lehtinen (1981: 17) and then to *Perania* by Schwendinger (1989: 579).

When Bourne (1980) synonymised *Perania pallida* with either *Paculla picea* or *Paculla nigra* (unclear; see above), and when Lehtinen (1981) unambiguously synonymised *Perania pallida* with *Paculla nigra*, both authors at the same time also transferred *Paculla picea* and *Paculla nigra* to *Perania*. Therefore *Perania pallida* (the type species of *Perania*) was never in *Paculla* and certainly never in *Phaedima* Thorell. Strictly speaking *Paculla* and *Phaedima* Thorell are thus not synonyms of *Perania*.

DIAGNOSIS: Distinguished from all other Pacullinae by both sexes possessing fragmented lateral opisthosomal plates and a relatively large, posteriorly widened

sternal apophysis; males with a clypeal process (not present in all species), conical setal bases on tibia I and metatarsus I, and a long, narrow cymbial apex (except for one species); females with a reduced dorsal opisthosomal plate, a more or less strongly fragmented anterior opisthosomal plate (except for one species), a more or less strongly fragmented preanal plate, a completely fragmented postgenital plate, and a leathery anterior collar of their vulva.

DESCRIPTION: The following can be added to the observations of Bourne (1980: 252-254) and Lehtinen (1981: 14): Body length 4-13 mm. "Thoracic" portion of carapace in both sexes unmodified (in most species), or with a pair of low humps (only in *P. nigra*; Fig. 21A-D), or with a pair of long, pointed, dorsad-directed horns (only in *P. armata*; Fig. 24A-F). Clypeus of males unmodified, or with a more or less strongly developed process [short, truncate or pointed (Figs 27A-D, 30A-B); or medium-sized to long and digitiform (Figs 15A-B, 19A-F, 31A-D, 34A-B); or long and apically widened (Figs 4A-D, 7A-B, 9A-E, 12A-B, 17A)]. Clypeus of females unmodified (in most species), or with a short, rounded hump (in *P. tumida* sp. n., *P. egregia* sp. n. and *P. quadrifurcata* sp. n.; Figs 7C-F, 9F-J and 12G-H, respectively), or with a short, pointed cone (only in some females of *P. deelemanae* sp. n.; Fig. 31F-H). The larger the clypeal process, the lower the "cephalic" portion of the carapace. Chelicerae of most males and females unmodified (Fig. 2H), or with a distolateral boss in males of *P. robusta* and *P. siamensis* (Fig. 2A, E), or with a mediolateral hump in both sexes (more pronounced in female) of *P. coryne* (Fig. 17B-C). Sclerotised parts of legs and palps very dark (as sclerites elsewhere on the body), contrasting with white or cream-coloured membranes. Tibia I and metatarsus I (in *P. utara* sp. n. also metatarsus II) of all males with conical setal bases prolaterally to ventrally (Fig. 36G-H); these mostly absent in females (present, but weaker than in males, on leg I of all *P. egregia* sp. n. and some *P. quadrifurcata* sp. n.). Metatarsus I in males and females of *P. cerastes* and *P. coryne* ventrally with slightly to moderately elevated setal bases carrying proximally thick, strongly sigmoid setae abruptly turning distad and then away from axis of metatarsus (Fig. 36G); in males and females of *P. robusta* equivalent setae also with basal thickening (like an onion plant) but distal portion straight or only slightly sigmoid; these setae in other species unmodified. Postgenital plate of males short and usually more or less completely fused to posterior margin of pulmonary plate (Figs 27F, 36B-C), rarely separate (Fig. 27E); in females always completely fragmented into microplates (Fig. 36E). Preanal plate well-developed in males (Fig. 36A-C); in females more or less modified: reduced to a short, transverse, compass-needle shaped sclerite [in *P. nigra* (Fig. 21F), *P. siamensis* and in some *P. quadrifurcata* sp. n. and some *P. cerastes*], or fragmented into normal or slightly enlarged microplates (in most species; Fig. 36E). Opisthosoma additionally with three pairs of ventrolateral plates with a finely granular surface, lying laterally between unpaired ventral plates (pulmonary, postgenital, preanal and anal plates) with a smooth surface: (1) anterior ventrolateral plates long, narrow, lying parallel to lateral margin of pulmonary plate or being more or less fused with it, (2) median pair [corresponding to Shear's (1978: 8) "perigenital plates"] somewhat triangular, with or without interconnecting bridge or bridge fragments (in males only), situated between postgenital plate and preanal plate,

(3) posterior pair oval to triangular, smaller than the other pairs, always without inter-connecting bridge, situated between preanal plate and anal plate (Fig. 36B-C, E). Strap-like lateral plates mostly absent (distinct rudiments only in male of *P. selatan* sp. n.), but instead several bands of microplates present. Posterior side of opisthosoma of males with bands of isolated microplates (in continuation of lateral bands), or with up to seven horizontal strap-like plates (Fig. 37B-C); only female of *P. utara* sp. n. with eight such strap-like plates (shorter than in male), in females of all other species these being fragmented into isolated microplates (Fig. 37D). Microplates near posterior margin of dorsal scutum conically elevated in females of some species (Fig. 36E); not so in males. A few microplates on anterior side of opisthosoma on or above anterior margin of pulmonary plate obliquely elevated and pointed in males and females (less distinct) of *P. harau* sp. n., *P. deelemanae* sp. n. and *P. selatan* sp. n.

Male palp usually with quite long and pointed (in most species; e.g. Fig. 28E, J), rarely short and blunt cymbial apex (only in *P. egregia* sp. n.; Fig. 10C-D); bulb of palpal organ globular (e.g. Fig. 13A) or pear-shaped (e.g. Fig. 25A, C), with a constricted V-shaped (e.g. Fig. 19H, J) or U-shaped (e.g. Fig. 25A) transition to the embolus (in most species), rarely without a recognisable transition (only in *P. egregia* sp. n.; Fig. 10A-B, E); embolus rarely straight, short, deep/wide at base (only in *P. egregia* sp. n.; Fig. 10A-B, E), usually sigmoid, long, narrow/shallow at base (all other species; e.g. Fig. 7G-H); apex of embolus somewhat triangular (Fig. 2B-C), or fan-shaped (Fig. 2F), or deeply divided into 2-4 tips or lobes (the upper one, if present, called "subterminal lamella", the lower one "embolic part"; e.g. Fig. 2I). No conductor. Palpal tarsus of females without claw. Pocket-like vulva with rigid, partially or completely pigmented ventral wall and with a membranous, transparent dorsal wall, both continuing into the anterior part of the cuticular uterus in the form of a leathery, strongly pigmented (at least in posterior portion), dorso-ventrally depressed anterior collar (e.g. Fig. 2K, P); a pair of large, more or less distinctly fused, pigmented or unpigmented ventral spermathecae situated between genital atrium and anterior collar (e.g. Fig. 2K); spermathecae with more or less clearly outlined patches of gland pores anteriorly and laterally (extending far onto dorsal sides in some species; e.g. Fig. 23A) in all species (e.g. Fig. 2K), and with external ventral pouches (only in *P. utara* sp. n.; Fig. 18E-G) or internal ventral chambers (e.g. Fig. 33B-E) in some species.

SPECIES INCLUDED: *P. armata* (Thorell, 1890) (Sumatra), *P. birmanica* (Thorell, 1898) (Myanmar), *P. cerastes* Schwendinger, 1994 (peninsular Malaysia), *P. coryne* Schwendinger, 1994 (peninsular Malaysia), *P. egregia* sp. n. (Thailand), *P. ferox* sp. n. (Thailand), *P. harau* sp. n. (Sumatra), *P. deelemanae* sp. n. (Sumatra), *P. korinchica* Hogg, 1919 (Sumatra), *P. nasicornis* Schwendinger, 1994 (Thailand), *P. nasuta* Schwendinger, 1989 (Thailand), *P. nigra* (Thorell, 1890) (Sumatra), *P. picea* (Thorell, 1890) (Sumatra), *P. quadrifurcata* sp. n. (Thailand), *P. robusta* Schwendinger, 1989 (Thailand, China), *P. selatan* sp. n. (Sumatra), *P. siamensis* Schwendinger, 1994 (Thailand), *P. tumida* sp. n. (Thailand), *P. utara* sp. n. (Sumatra). Total: 19 species.

DISTRIBUTION: Southern China, eastern Myanmar (=Burma), Thailand, peninsular Malaysia, Sumatra, islands of the Lingga Archipelago (Fig. 1).

KEY TO THE SPECIES OF *PERANIA*:

- 1 Males 2
- Females 15
- 2(1) “Thoracic” portion of carapace with a pair of long, straight, pointed horns (Fig. 24A-C). Western Sumatra *P. armata*
- “Thoracic” portion of carapace without such horns (only a pair of indistinct humps in that position in *P. nigra*, Fig. 21A-C) 3
- 3(2) Clypeus without process 4
- Clypeus with process 7
- 4(3) Chelicerae with distolateral boss or hump (Fig. 2A, E; not to be confused with mediolateral bulge on chelicerae of male and female of *P. coryne*, see Fig. 17B-C) 5
- Chelicerae without distolateral boss or hump (Fig. 2H) 6
- 5(4) Large spiders (5.8-6.6 mm carapace length); chelicerae with pronounced distolateral boss (Fig. 2A); metatarsus I ventrally with a band of proximally swollen, straight setae; apex of embolus shallow (only slightly deeper than median portion of embolus), somewhat triangular, indistinctly bifid (Fig. 2B-C). Northern Thailand, southern China *P. robusta*
- Medium-sized spiders (4.7-5.4 mm carapace length); chelicerae with less pronounced distolateral hump (Fig. 2E); metatarsus I ventrally with normal setae; apex of embolus not split, much deeper than median portion of embolus, fan-shaped (Fig. 2F). Southern Thailand *P. siamensis*
- 6(4) “Thoracic” portion of carapace with a pair of low humps (Fig. 21A-C); embolus much longer than bulbus, together forming a U with near parallel sides (Fig. 22A). No conical setal bases on metatarsus II. Western Sumatra *P. nigra*
- “Thoracic” portion of carapace without posterior humps; embolus about as long as bulbus, at right angles to each other (Fig. 18B-D). Conical setal bases (as in Fig. 36H) on metatarsus II. Northern Sumatra . *P. utara* sp. n.
- 7(3) Clypeal process short, more or less distinctly pointed, occupying less than 10% of carapace length (Figs 27A-D, 30A-B, 34A-B) 8
- Clypeal process medium-sized or long, occupying distinctly more than 10% of carapace length, digitiform, apex not wider than its base in dorsal view (Figs 15A-B, 19A-F, 31A-D) 9
- Clypeal process long, occupying about 20-30% of carapace length, apex distinctly wider than base in dorsal view (Figs 4A-D, 7A-B, 9A-E, 12A-B, 17A) 10
- 8(7) Clypeal process indistinct, pointed (Fig. 27A-D). Median portion of embolus only slightly bent, about as deep as base of embolus; sub-terminal lamella short, triangular or rounded, distad-directed; embolic part tapering, abruptly bent ventrad (Fig. 28). No remnants of lateral opisthosomal plates; no or only few microplates on posterior side of opisthosoma interconnected. Western Sumatra *P. picea*
- Clypeal process indistinct, asymmetrically pointed (Fig. 30A-B). Median portion of embolus strongly bent, distinctly deeper than base;

subterminal lamella a broadly and obliquely truncate lobe; embolic part a small pointed tooth with slightly bent tip, directed ventrad (Fig. 30C-H). No remnants of lateral opisthosomal plates; five distinct strap-like horizontal plates on posterior side of opisthosoma. Western Sumatra

..... *P. korinchica*

- Clypeal process distinct, pointed (Fig. 34A-B). Median portion of embolus strongly bent, as deep as or only slightly deeper than base of embolus; subterminal lamella a narrowly rounded, distad-directed lobe; embolic part indistinct, a short, widely rounded lobe (Fig. 34D-G). Remnants of lateral plates in anterior portion of opisthosoma; no or only few microplates in bands on posterior side of opisthosoma interconnected. Southern Sumatra *P. selatan* sp. n.
- 9(7) Clypeal process long (occupying more than 20% of carapace length; Fig. 15A-B); ventral side of metatarsus I with proximally swollen, strongly sigmoid setae on low tubercles (Fig. 36G); embolus short, slightly bent, median portion with small prodorsal tooth; no ventrad-directed subapical lamella; apex deep, distinctly bifid, carrying a group of spinuli-form microtrichia and a bulge prolaterally (Fig. 15C-T). Peninsular Malaysia *P. cerastes*
- Clypeal process medium-sized (10-15% of carapace length; Fig. 19A-F); metatarsus I ventrally without strongly sigmoid setae; embolus long, strongly sigmoid, median portion straight; a triangular, ventrad-directed subapical lamella below shallow, hook-shaped apex; subterminal lamella very indistinct, distad-directed, embolic part tapering (Fig. 19G-J). Western Sumatra *P. harau* sp. n.
- Clypeal process medium-sized (10-15% of carapace length; Fig. 31A-D); metatarsus I ventrally without strongly sigmoid setae; embolus long, strongly sigmoid, its apex slightly deeper than median portion, lanceolate, with a short, widely rounded, dorsad-directed subterminal lamella; no ventral subapical lamella (Fig. 32B-F). Southern Sumatra *P. deelemanae* sp. n.
- 10(7) Cymbium short, its apex strongly reduced and widely truncate (Fig. 10C, D); palpal organ exceptionally stout, without marked transition between bulb and embolus (Fig. 10A-B, E). Northeastern Thailand . . *P. egregia* sp. n.
- Cymbium long, its apex well-developed, narrow and pointed (Figs 5A-C, 7G-I, 13A-C); palpal organ with marked transition between voluminous bulb and slender embolus (Figs 5A-B, 7G-H, 13A-B) 11
- 11(10) Clypeal process hourglass-shaped in dorsal view, its distal margin strongly arched (Fig. 17A); retrolateral margin of chelicera with weak (in female more pronounced) median bulge (Fig. 17B); metatarsus I ventrally with strongly sigmoid, proximally swollen setae on slightly elevated bases (as in Fig. 36G); apex of embolus not much deeper than base, indistinctly divided into small, narrowly rounded or pointed subterminal lamella and larger, more widely rounded, lobate embolic part (Fig. 17D-E). Peninsular Malaysia *P. coryne*

- Clypeal process anvil-shaped in dorsal view, its distal margin slightly arched or straight (Figs 4A, C-D, 7A, 12A); metatarsus I ventrally without strongly sigmoid setae; apex of embolus different12
- 12(11) Apex of embolus with four distinct tips (two on each part of deeply split apex), three of them long, shallow and pointed, one of them short, deeper and rounded (Fig. 13A-B, D-G). Western and eastern Thailand
..... *P. quadrifurcata* sp. n.
- Apex of embolus different, if four tips present, then three of them on embolic part of split apex and not pointed (Figs 2I-J, M-N, 5A-B, D-G, 7G-H) 13
- 13(12) Deep and lobate subterminal lamella clearly surpassing shallow pointed embolic part without a dorsal lobe (Fig. 5A-B, D-G). Western Thailand
..... *P. ferox* sp. n.
- Subterminal lamella not or only indistinctly surpassing deep embolic part carrying a dorsal lobe 14
- 14(13) Subterminal lamella and embolic part not or only slightly overlapping, the former narrowly rounded, the latter broadly truncate (Fig. 2I-J). Northern Thailand *P. nasuta*
- Subterminal lamella and embolic part distinctly overlapping, the former narrowly rounded, the latter tripartite, its median process lobate, widely rounded and most prominent, its lower process small, digitiform and ventrad-directed (Fig. 7G-H). Northern Thailand *P. tumida* sp. n.
- Subterminal lamella and embolic part distinctly overlapping, the former widely rounded, the latter indistinctly bipartite, its lower process large, deep, with pointed, distad-directed tip (Fig. 2M-N). Northern Thailand
..... *P. nasicornis*
- 15(1) "Thoracic" portion of carapace with a pair of long, pointed horns (Fig. 24D). Anterior opisthosomal plate entire, separated from pulmonary plate (Fig. 24H-I). Ventral wall of spermathecae with a pair of internal chambers separated from each other (Fig. 26B, E). Western Sumatra *P. armata*
- "Thoracic" portion of carapace with a pair of indistinct humps (Fig. 21D). Anterior opisthosomal plate entire, widely connected to pulmonary plate (Fig. 21E). Ventral wall of spermathecae with a pair of internal chambers connected to each other by a median bridge (Fig. 23B, E). Western Sumatra *P. nigra*
- "Thoracic" portion of carapace without modifications. Anterior opisthosomal plate more or less strongly fragmented, not connected to pulmonary plate (e.g. Fig. 31I) 16
- 16(15) Eight more or less complete strap-like horizontal plates on posterior side of opisthosoma (Fig. 37C). Ventral wall of spermathecae with a large pair of external pockets (Fig. 18E-G) *P. utara* sp. n.
- Only bands of microplates on posterior side of opisthosoma (as in Fig. 37D). Ventral wall of spermathecae without external pockets 17

- 17(16) Ventral wall of spermathecae with a pair of internal chambers (Figs 20B-D, 23B-C, E-F, 26B-C, E-F, 29B-C, 33B-E, 35B-E) 27
- Ventral side of of spermathecae without internal chambers 18
- 18(17) Tibia I and metatarsus I usually with conical setal bases ventrally (as in Fig. 36H; only absent in one *P. quadrifurcata* sp. n. female examined) 19
- Leg I always without conical setal bases 20
- 19(18) Clypeal hump always distinct (Fig. 9F-J); spermathecae without postero-lateral compartments; anterior collar of vulva surpassing spermathecae for almost their length; median zone of anterior collar distinctly less pigmented than lateral zones (Fig. 11). Northeastern Thailand . *P. egregia* sp. n.
- Clypeal hump indistinct (Fig. 12G-H) or absent; each spermatheca with a distinctly separate posterolateral compartment; anterior collar of vulva not or only slightly surpassing spermathecae; median zone of anterior collar slightly less pigmented than lateral zones (Fig. 14A-D). Western to northeastern Thailand *P. quadrifurcata* sp. n.
- 20(18) Clypeal hump always present, distinct or indistinct (Fig. 7C-F); vulva as in Fig. 8. Northern Thailand *P. tumida* sp. n.
- Clypeal hump always absent; vulva different 21
- 21(20) Spermathecae with indistinctly outlined anterolateral porepatches lying in more or less distinct trenches (Figs 2L, P, 3F); ventral wall of genital atrium and posterior portion of spermathecae only little less pigmented than porepatches (Figs 2K, O, 3E) 25
- Spermathecae with strongly pigmented, distinctly outlined anterior porepatches on bulged surface, no trenches anterolaterally (Figs 2D, G, 16E-F, 17G); posterior portion of spermathecae unpigmented (Figs 16A-C, 17F); ventral wall of genital atrium pigmented or unpigmented . . . 22
- 22(21) Ventral wall of genital atrium completely or partially pigmented (Figs 16A-D, 17F); metatarsus I ventrally with proximally swollen, strongly sigmoid setae on slightly elevated bases (Fig. 36G) 23
- Ventral wall of genital atrium largely unpigmented (except for a narrow marginal pigmentation); metatarsus I ventrally without strongly sigmoid setae 24
- 23(22) Porepatches of vulva separated from each other by roughly their width (Fig. 16A-C, E-F). Ventral wall of genital atrium completely pigmented (Fig. 16A-D). Chelicerae unmodified. Peninsular Malaysia *P. cerastes*
- Porepatches of vulva separated from each other by much less than their width (Fig. 17F-G). Ventral wall of genital atrium pigmented in lateral thirds, median third unpigmented (Fig. 17F). Retrolateral surface of chelicerae distinctly bulged in the middle (Fig. 17C). Peninsular Malaysia *P. coryne*
- 24(22) Spermathecae relatively small, widely separated from each other (Fig. 2D). Large spiders (5.8-6.6 mm carapace length). Northern Thailand and southern China *P. robusta*
- Spermathecae relatively large, almost touching each other in the middle (Fig. 2G). Medium-sized spiders (4.7-5.4 mm carapace length). Southern Thailand *P. siamensis*

- 25(21) Vulva much wider than long; anterior collar not surpassing widely arched common anterior margin of spermathecae (Fig. 3D-E); anterolateral sides of spermathecae with deep trenches (Fig. 3F). Eastern Myanmar *P. birmanica*
- Vulva longer than wide or only slightly wider than long; anterior collar far surpassing invaginated common anterior margin of spermathecae; anterolateral sides of spermathecae slightly bulged, plane or with shallow trenches (Fig. 2K-L, O-P) 26
- 26(25) Opisthosoma with conical microplates behind dorsal scutum; spermathecae posteriorly narrower or only slightly wider than anteriorly, lateral margins of spermathecae straight or slightly and evenly convex (Fig. 2K). Northern Thailand *P. nasuta*
- Opisthosoma without elevated microplates; spermathecae posteriorly distinctly wider than anteriorly, their lateral margins distinctly bulged posteriorly (Fig. 2O). Northern Thailand *P. nasicornis*
- 27(17) Anterior opisthosomal plate fragmented into microplates of similar size. Ventral wall of genital atrium entirely pigmented, relatively long; internal ventral chambers small and with entire walls, or large with broken walls, always without longitudinal ribs; anterior margin of anterior collar of vulva slightly arched (Figs 20A-C, 29A-B) 29
- Anterior opisthosomal plate fragmented into numerous microplates and three larger plates (Fig. 31I). Ventral wall of genital atrium only pigmented in median zone, relatively short; internal chambers of spermathecae large and wide, their walls entire, thick and always enforced with longitudinal ribs; anterior margin of anterior collar of vulva strongly arched (Figs 33A-B, D-E, 35A-B, D-E) 28
- 28(27) Common anterior margin of spermathecae straight or only slightly invaginated; internal chambers of spermathecae distinctly separated from each other (Fig. 33B, D-E). A short, pointed cone on clypeus of some (but not all) females (Fig. 31F-H). Southern Sumatra *P. deelemanae* sp. n.
- Common anterior margin of spermathecae deeply invaginated; internal chambers of spermathecae close to or in contact with each other (Fig. 35B, D-E). Clypeus always unmodified. Southern Sumatra *P. selatan* sp. n.
- 29(27) Internal chambers of spermathecae relatively wide, their walls open on both lateral sides, posteriorly indistinct, anteriorly slivered into 2-3 parallel stripes (Fig. 29B); large spiders (4.8-4.9 mm carapace length). Western Sumatra *P. picea*
- Internal chambers of spermathecae relatively narrow, their walls entire or open laterally on both sides, posteriorly distinct, anteriorly entire (Fig. 20B-C); medium-sized spiders (3.5-4.0 mm carapace length). Western Sumatra *P. harau* sp. n.

THE *PERANIA ROBUSTA* SPECIES GROUP

DIAGNOSIS: Characterized by a wide vulva with largely unpigmented (pigmentation only in a narrow band along posterior margin) ventral wall of genital atrium; spermathecae with clearly outlined anterior porepatches not or only very slightly extending onto dorsal side, posterior portion of spermathecae unpigmented. Males without clypeal process and with a more or less distinctly developed distal-retrolateral boss on chelicerae; femora of legs and palps granular (with slightly elevated setal bases); anterior ventrolateral plate free or at its posterior end fused to pulmonary plate; bulbus of palpal organ ovoid, apex of embolus not or only indistinctly bifid.

SPECIES INCLUDED: *Perania robusta*, *P. siamensis*.

DISTRIBUTION: Yunnan Province in southern China, northernmost tip of Thailand (and probably the area in between); southern Thailand (Fig. 1, localities 1-8).

***Perania robusta* Schwendinger, 1989**

Figs 2A-D, 36E

Perania robusta Schwendinger, 1989: 577-579 (description of male and female). – Lian, 2009: 31-33, figs 1-3 (description of male and female); Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Thailand, Chiang Mai Province, Doi Angkhang (19°53'39"N, 99°02'28"E), 1450 m; 22.IV.1987; leg. P. J. Schwendinger.

PARATYPES: 2 ♂ and 1 ♀; 22.IV.1987, 30.X.1987, otherwise same data as for holotype.

NEW MATERIAL EXAMINED: MHNG; 1 ♀ (25.VIII.1990), 2 ♂, 2 ♀, 1 juv. (2.XI.1990); same locality and altitude as for holotype; leg. P. J. Schwendinger.

DIAGNOSIS: See Schwendinger (1989: 677).

NEW CHARACTERS: Metatarsus I of males more strongly curved than in males of other species; axis of tarsus I not in line with axis of metatarsus I. Males and females with a broad band of proximally swollen, straight setae rising from ventral side of metatarsus I and metatarsus II (on the latter less pronounced) at an unusually acute angle. Anterior pair of ventrolateral plates in males free, not connected with pulmonary plate. Postgenital plate of males relatively large, with angular posterior margin, completely fused to pulmonary plate, both plates linked by a suture. This suture usually sclerotised, in one paratype only lightly sclerotised in a narrow zone behind gonopore; in one non-type male a small unsclerotised slit on the left side of the suture. Anterior opisthosomal plate and preanal plate of all females completely fragmented into isolated microplates. Apex of embolus shallow (only slightly deeper than median portion of embolus) and indistinctly bifid: subterminal lamella broadly truncate and ventrad-directed, separated from short and triangular embolic part by a small indentation (Fig. 2B-C). Vulva with spermathecae separated by a wide unpigmented median zone (Fig. 2D). Spermathecae slightly bulged ventrally, with pores situated mostly in anterior portion, posterior portion (especially anteromedially) with very few or no pores. Ventral wall of genital atrium largely unpigmented apart from a short zone along posterior margin of genital orifice.

DISTRIBUTION: Originally described from northern Thailand, this species was later also recorded from Yunnan Province in southern China (Lian, 2009; Fig. 1, localities 1-3). It most likely also occurs in Burmese territory between these localities.

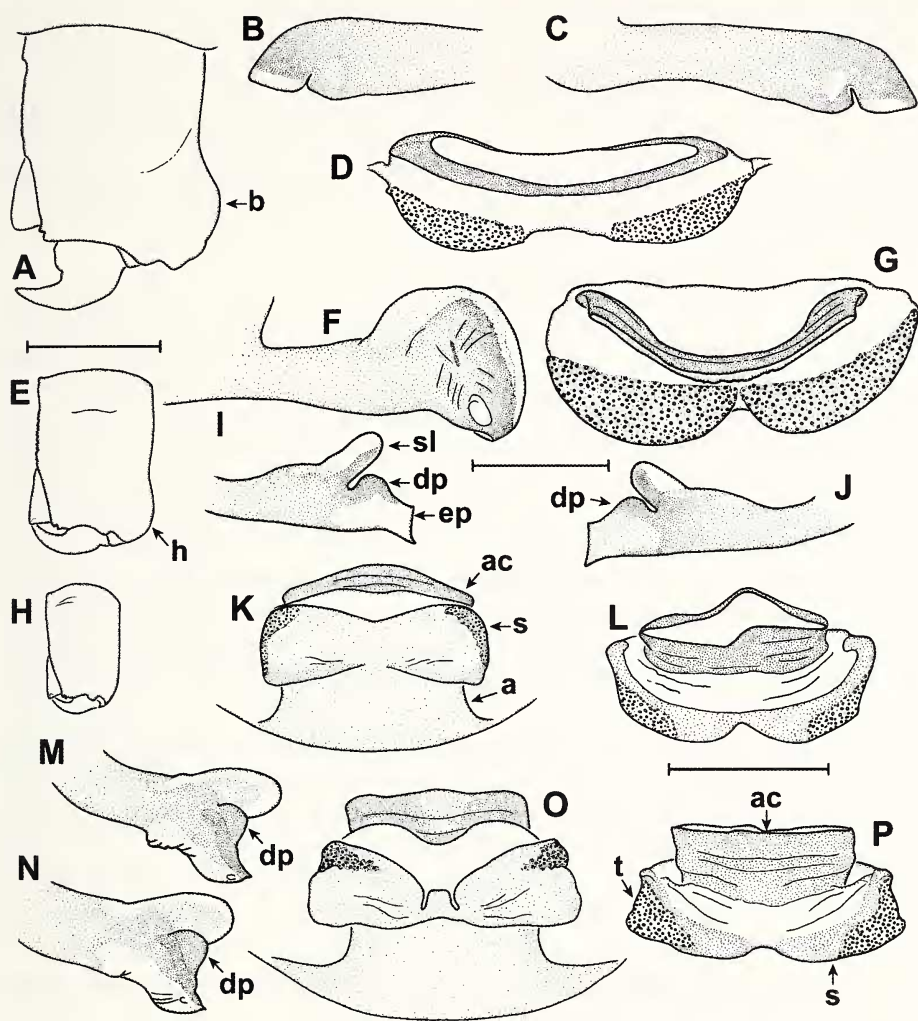


FIG. 2

Perania robusta (A-D), *P. siamensis* (E-G), *P. nasuta* (H-L) and *P. nasicornis* (M-P); new specimens (A-K; H-K from Doi Suthep) and paratypes (L-P). (A, E, H) Left chelicera of male, anterior view. (B, J) Apex of left embolus, retrolateral view. (C, F, I, M-N) Same, prolateral view. (D, G, L, P) Vulva, anterior view. (K, O) Same, ventral view. Abbreviations: a = atrium, ac = anterior collar, b = distolateral boss, dp = dorsal projection on embolic part of apex of palpal organ, ep = embolic part of apex of palpal organ, h = distolateral hump, sl = subterminal lamella, t = trench. Scale lines 1.0 mm (A, E, H), 0.5 mm (B-C, F, I-J, M-N; D, G, K-L, O-P).

***Perania siamensis* Schwendinger, 1994**

Fig. 2E-G

Perania siamensis Schwendinger, 1994: 452-456, figs 15-25 (description of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Thailand, Ranong Province, about 4 km east of Ranong city, on road to Had Sompae (9°57'47"N, 98°40'41"E), 50 m; 18.IX.1992; leg. P. J. Schwendinger.

PARATYPES: MHNG; 1 ♂, 3 ♀; same data as for holotype.

OTHER MATERIAL EXAMINED (INCLUDING NEW MATERIAL): MHNG; 1 ♂, 3 ♀; Thailand, Prachuab Khiri Khan Province, Thab Sakae District, Huay Yang National Park (11°37'45"N, 99°34'41"E), 700 m; 29.XI.1991. – MHNG; 3 ♀; Thailand, Ranong Province, Kapoe District, Khlong Nakha Wildlife Sanctuary (9°27'26"N, 98°30'43"E), 30 m; 29.I.1991. – MHNG; 1 ♂, 6 ♀; Thailand, Krabi Province, Khao Phanom District, Khao Phanom Bencha National Park, above Huay To Waterfall (8°14'19"N, 98°55'11"E), 220-260 m; 22.IX.1992, 22.VII.2005. – MHNG; 3 ♂, 1 ♀; Thailand, Krabi Province, Ao Luk District, Thanboke Khoranee National Park, near Sra Boke Khoranee (8°23'12"N, 98°44'16"E), 50 m; 18./19.IX.2006. – MHNG; 1 ♀; Thailand, Phang Nga Province & District, forest above Chao Ngu Cave (8°26'55"N, 98°32'52"E), 250 m, 14.VII.2011. All leg. P. J. Schwendinger.

DIAGNOSIS: See Schwendinger (1994: 452).

NEW CHARACTERS: Metatarsi I and II in males and females without modified ventral setae (as present in *P. robusta*). Anterior pair of ventrolateral plates in males mostly free, only their posterior tips fused with pulmonary plate. Postgenital plate in males not (linked by a pigmented but not sclerotised suture) or only partially fused (suture sclerotised in some portions) with posterior margin of pulmonary plate. Preanal plate of females always distinct but very short, anterior opisthosomal plate completely fragmented. Apex of embolus very deep and fan-shaped, without separation into subterminal lamella and embolic part (Fig. 2F). Vulva with both spermathecae strongly bulged, medially close to each other, separated by a deep and narrow gap; anterolateral sides of spermathecae convex, porepatches large (Fig. 2G); posterior portion of spermathecae completely unpigmented. Ventral wall of genital atrium largely unpigmented except for a narrow triangular, strongly pigmented zone along each lateral margin.

REMARKS: Sra Boke Khoranee and Chao Nu Cave are new localities which lie within the previously known range of this species. At these two sites spiders were collected from webs running into cracks and holes in limestone cliffs and limestone outcrops. The new specimens from Khao Phanom Bencha were found on earthbanks in a semi-evergreen rainforest. The new females are all relatively large, in the size range of the females from Huay Yang and Khao Phanom Bencha mentioned in Schwendinger (1994: 445).

DISTRIBUTION: Southern Thailand, from Prachuab Khiri Khan Province to Krabi Province (Fig. 1, localities 4-8).

THE *PERANIA NASUTA* SPECIES GROUP

DIAGNOSIS: Spermathecae and ventral wall of genital atrium entirely and uniformly pigmented; porepatches on spermathecae indistinctly outlined, only little extending onto dorsal side of vulva; areas with porepatches bulged or forming more or less distinct trenches. Females of some species with clypeal hump and with conical setal bases ventrally on tibia I and metatarsus I. Males (unknown for *P. birmanica*) with long clypeal process with widened, flattened and truncate apex; no distolateral chelicerar boss; anterior pair of ventrolateral plates in males completely or largely free; bulbous of male palpal organ mostly globular (except for *P. egregia* sp. n.), apex of embolus divided into 2-4 tips; subterminal lamella always present and pronounced, lobate or bifid, smaller or larger than embolic part. Femora of legs and palps in males granular (with slightly elevated setal bases).

SPECIES INCLUDED: *Perania birmanica*, *P. egregia* sp. n., *P. ferox* sp. n., *P. nasicornis*, *P. nasuta*, *P. quadrifurcata* sp. n.

DISTRIBUTION: Eastern Myanmar, western, northern and northeastern Thailand (Fig. 1, localities 9-19).

Perania nasuta Schwendinger, 1989

Figs 2H-L, 37D

Perania nasuta Schwendinger, 1989: 574-577, figs 6-11, 24-25 (description of male and female).
– Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Thailand, Chiang Mai Province, Chomthong District, Doi Inthanon (18°31'33"N, 98°29'50"E), 1700 m; 8.X.1987, leg P. J. Schwendinger.

PARATYPES: MHNG; 3 ♂, 3 ♀; 1986-1988, otherwise same data as for holotype; leg. P. J. Schwendinger.

NEW MATERIAL EXAMINED: MHNG; 1 ♂; 15.X.1993, otherwise same data as for holotype; leg. P. J. Schwendinger. – MHNG; 2 ♂, 1 juv.; Chiang Mai Province and District, Doi Suthep-Pui, ravine near Chang Khian Agricultural Station (18°50'09"N, 98°53'47"E), 1420 m; 11.-12.II.1998; leg. P. J. Schwendinger & C. Kropf. – MHNG; 6 ♂ and 4 ♀; same locality; 18.XII.2001; leg. P. J. Schwendinger.

DIAGNOSIS: See Schwendinger (1989: 574).

NEW CHARACTERS: Anterior opisthosomal plate of females fragmented into microplates (slightly larger than elsewhere on opisthosoma). Anterior pair of ventro-lateral plates of males free, not connected with pulmonary plate. Postgenital plate of males usually completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate of females fragmented into microplates. Apex of embolus deeply split, narrowly rounded subterminal lamella and broadly truncate embolic part not overlapping each other, embolic part with a lobate dorsal projection (Fig. 2I-J). Vulva with posterior dorsal margin of anterior collar more or less straight (unlike in *P. birmanica*); spermathecae with postero-lateral corners not bulged, lateral margins straight or slightly arched (Fig. 2K).

VARIATION: In the holotype and all male paratypes (all from Doi Inthanon) the microplates in the first row of the posterior side of the opisthosoma are interconnected and form a strap-like horizontal plate which is at its lateral ends connected to the posterior margin of the dorsal scutum. In one male from Doi Inthanon and in all males from Doi Suthep-Pui the microplates in the upper row are posteriorly not interconnected (except on one side in one specimen). In three males from Doi Suthep the dorsal scutum is not connected to the upper row of posterior microplates. The postgenital plate of one paratype is partly separated from the pulmonary plate by a short and narrow membranous zone behind the gonopore. All microplates in the preanal region of females from Doi Inthanon are isolated, in females from Doi Suthep-Pui the posterior microplates in that region are laterally more or less distinctly interconnected. All females from Doi Suthep-Pui have less distinctly elevated conical microplates behind the dorsal scutum of the opisthosoma than the females from the type locality.

In two females from Doi Suthep-Pui the vulva has a shorter anterior collar (but still distinctly protruding beyond the anterior margins of the spermathecae, see Fig. 2K) than that of two female paratypes from Doi Inthanon. The anterior collar in the vulva illustrated by Schwendinger (1989: fig. 17) is longer than in the other three

females examined later, possibly expanded due to swelling caused by clearing in KOH. The vulvae of two females from Doi Suthep-Pui have a relatively short genital atrium and spermathecae that are posteriorly slightly wider than anteriorly (Fig. 2K), whereas in the vulvae of two females from the type locality the genital atrium is relatively longer and the spermathecae are anteriorly wider than posteriorly. In contrast to vulvae of *P. nasicornis*, the widening of the *P. nasuta* spermathecae is gradual and the lateral margins are straight or slightly rounded (Fig. 2K cf. Fig. 2O). The distinction between females of *P. nasuta* and *P. nasicornis* are thus less pronounced than previously assumed. See also Remarks under the following species.

REMARKS: All adult specimens (holotype and paratypes) that were available for the description of this species were collected on Doi Inthanon at 1700 m. Two presumably conspecific juveniles were also mentioned. One of them is allegedly from an altitude of 2530 m on the same mountain, but that is probably a confusion of labels. The other juvenile is from the Doi Suthep-Pui at 1180 m, a mountain about 50 km northeast of the Doi Inthanon. The identification of the latter specimen can now be confirmed. Adult *Perania* subsequently collected at a second, nearby locality on the Doi Suthep-Pui (more precisely collected below Doi Pui; the mountain has two summits, called Doi Suthep and Doi Pui, about 1 km apart) clearly belong to *P. nasuta*.

DISTRIBUTION: Known from two mountains (about 50 km apart) in northern Thailand (Fig. 1, localities 9-10).

BIOLOGY: The new male from Doi Inthanon was adult when collected in mid-October on an earth bank at the side of a road. Three of the juvenile males collected from webs under loose stones in a ravine on Doi Suthep-Pui in late December matured between late September and early October of the following year. One juvenile female collected together with the juvenile males matured in early October of the following year, at the same time as the males. One male was adult when found at the same locality in early February. It appears that although adult spiders of this species can be found at all times of the year, their period of maturation is at the end of the rainy season, in September and October (see also Schwendinger, 1989: 574-577).

Perania nasicornis Schwendinger, 1994

Fig. 2M-P

Perania nasicornis Schwendinger, 1994: 448-452, figs 1-14 (description of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; 1 ♂; Thailand, Lamphun Province, Mae Tha District, Doi Khuntan (18°29'23"N, 99°17'55"E), 1250 m; 16.II.1992; leg P. J. Schwendinger.

PARATYPES: MHNG; 6 ♂, 4 ♀; from the type locality, 1000-1300 m; 6.II.1992, 8.X.1992, leg. P. J. Schwendinger. No additional material available.

DIAGNOSIS: See Schwendinger (1994: 448).

NEW CHARACTERS: Anterior opisthosomal plate of females fragmented into microplates of different sizes. Postgenital plate in all males completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them; all microplates on posterior side of opisthosoma of males close to each other but not fused into horizontal strap-like plates. Anterior pair of ventrolateral plates of males largely free,

only posterior tips fused with pulmonary plate. Preanal plate of females fragmented into microplates, some of the posterior ones slightly wider than the others. Apex of embolus distinctly split, with widely rounded subterminal lamella overlapping pointed embolic part with a quite large, lobate dorsal projection (Fig. 2M-N). Vulva with posterior dorsal margin of anterior collar very widely rounded (unlike in *P. birmanica*); spermathecae with lateral sides distinctly bulged in posterior portion (Fig. 2O).

REMARKS: The porepatches of all spermathecae are much larger than illustrated in the original description (Fig. 2O-P cf. Schwendinger, 1994: figs 13-14), extending on the lateral sides down to the posterior corners of the spermathecae (but usually not visible in ventral view because hidden behind the bulged posterolateral corners). This and the following two new observations on *P. nasuta* make the distinction between females of *P. nasicornis* and *P. nasuta* more difficult than given in the original description. Not all *P. nasuta* females have a longer anterior collar of the vulva than females of *P. nasicornis* (Fig. 2K cf. Fig. 2O). *Perania nasuta* females from Doi Suthep-Pui have spermathecae that are posteriorly slightly wider than anteriorly (Fig. 2K). Thus females of both species can be more reliably distinguished by the following: *Perania nasuta* with more or less distinctly elevated conical microplates behind dorsal scutum of opisthosoma (microplates not elevated in *P. nasicornis*); spermathecae posteriorly narrower or slightly wider than anteriorly (distinctly wider in *P. nasicornis*), their lateral margins not bulging outwards in posterior portion (distinctly bulged in *P. nasicornis*), pores visible along most of lateral sides in ventral view (pores hidden by bulged posterolateral corner in ventral view in *P. nasicornis*) (Fig. 2K cf. Fig. 2O). Differences were also found in the sizes of the fragments (microplates) of the anterior opisthosomal plates of females: in *P. nasicornis* two lateral, one central and all dorsal fragments (corresponding to the upper margin of the plate) are clearly larger than the remaining microplates; in *P. nasuta* only the two lateral fragments are enlarged. However, the latter differences are not pronounced and cannot be used as a reliable distinction between females of both species. They therefore have not been used in the key to the species.

DISTRIBUTION: Known only from a mountain in northern Thailand (Fig. 1, locality 11).

Perania birmanica (Thorell, 1898)

Fig. 3

Paculla birmanica Thorell, 1898: 282-283 (description of ♀).

Perania birmanica (Thorell, 1898). – Bourne, 1980: 256-259, figs 20-23 (re-description and illustration of holotype; transfer); Lehtinen, 1981: 16 (mention; transfer); Schwendinger, 1989: fig. 21 (illustration of outlines of spermathecae); Platnick, 2013 (listing).

HOLOTYPE: MCSN; ♀; “Birmania, Carin Ceba, Biapó” [on original labels], “Carin Chebà” or “Bia-pó” mountains [in original description], approximately 19°05’N, 96°35’E; 1885-1889; leg. Leonardo Fea.

DIAGNOSIS: Female holotype (male unknown) distinguished from females of other congeners by a dorsal opisthosomal scutum with a quite regularly elliptical margin (Fig. 3C; Bourne, 1980: fig. 21), and by largely fused spermathecae with a flat common ventral surface, a widely arched common anterior margin and distinct trenches in anterior and lateral sides.

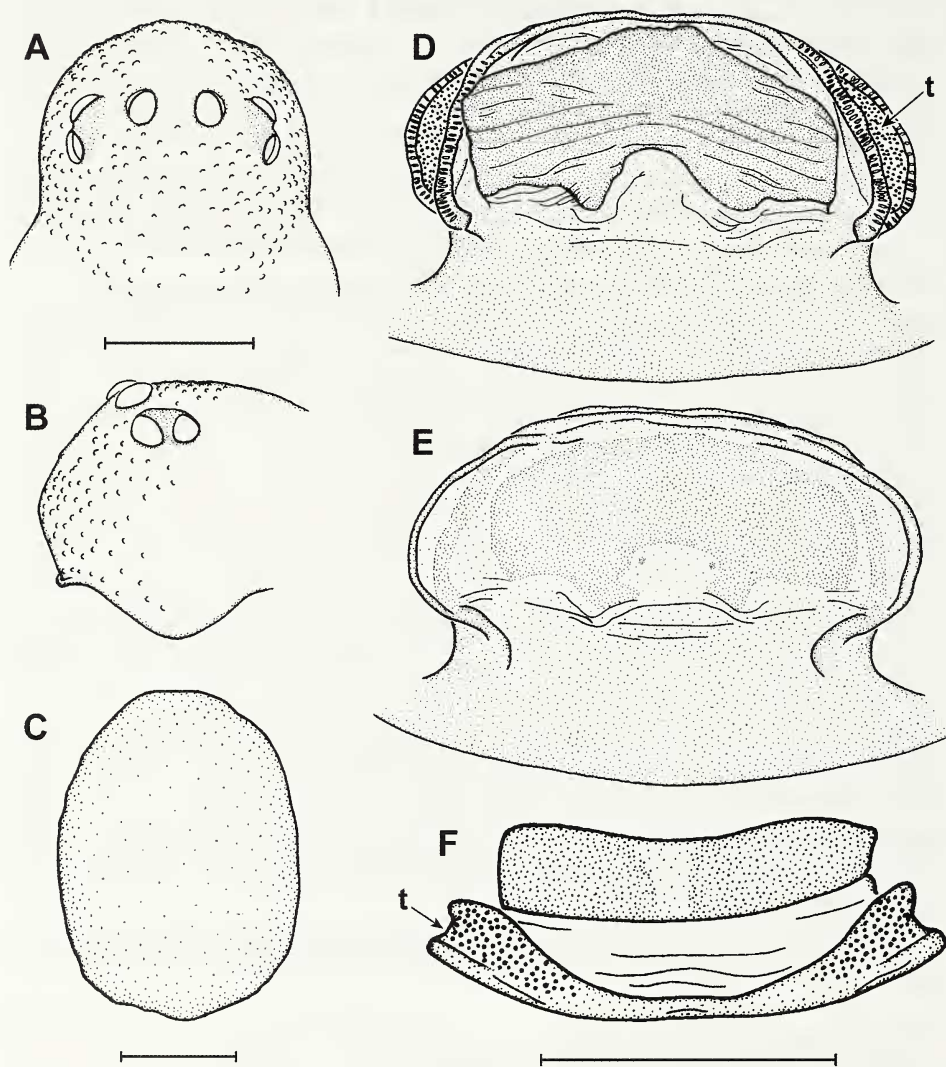


FIG. 3

Perania birmanica Thorell, 1898, female holotype. (A) Anterior portion of carapace, dorsal view. (B) Same, lateral view. (C) Dorsal scutum of opisthosoma, dorsal view. (D) Vulva, dorsal view. (E) Same, ventral view. (F) Same, anterior view. Abbreviation: t = trench. Scale lines 1.0 mm (A-B; C), 0.5 mm (D-F).

NEW CHARACTERS: Vulva with ventral side uniformly pigmented (no unpigmented zone between spermathecae and genital atrium; Fig. 3D-E) and uniformly flat (spermathecae not bulged; Fig. 3F). Vulva similar to that of *P. ferox* sp. n., distinguished by left and right spermathecae without depression or unpigmented zone between them; anterior and lateral sides of spermathecae with narrow porepatches

lying in distinct trenches (Fig. 3F); anterior collar with deep median invagination in posterior margin (Fig. 3D; possibly a condition of the holotype and not a character of the species). Outlines of the holotype's spermathecae shining through the intact genital plate illustrated by Schwendinger (1989: fig. 21). Preanal plate fragmented into microplates, the three posterior ones laterally connected with each other. Anterior opisthosomal plate completely fragmented.

RELATIONSHIPS: Strong similarities in copulatory organs of females and close geographical proximity indicate that *P. birmanica* is closely related to *P. ferox* sp. n. and *P. quadrifurcata* sp. n. Therefore it is quite likely that the unknown male of *P. birmanica* also has a long clypeal process. Lehtinen (1981: 16) speculated that *P. birmanica* could be close to *P. armata* from Sumatra, because Thorell (1898) compared the first with the second species, but there is no evidence for a close relationship between them.

DISTRIBUTION: Known only from the type locality in the mountains of the Karen (= Kayin) State, northeast of Toungoo (Fig. 1, locality 12). This area has been off limits to foreign visitors without a special permit for the last four and a half decades.

Perania ferox sp. n.

Figs 4-6

HOLOTYPE: MHNG; ♂; Thailand, Tak Province, km 121 on road from Mae Sot (= Mae Sod) to Umphang (about 16°14'N, 98°59'E), 1270 m; 8.X.1993; leg. P. J. Schwendinger.

PARATYPES: 2 ♂ (one matured in late January 1994) and 4 ♀ (one selected as "allotype") with same data as for holotype.

ETYMOLOGY: Latin adjective "ferox" = fierce; referring to the aggressive defence behaviour of this species.

DIAGNOSIS: Females most similar to the female holotype of *P. birmanica*, distinguished by slightly bulged spermathecae indistinctly separated from each other by oblique bands without pigmentation; anterolateral sides of spermathecae convex, poreplates not lying in trenches; posterior margin of anterior collar fairly straight, without median indentation. Males with long clypeal process; palpal organ similar to that of *P. nasicornis*, but embolic part of apex shallower, without dorsal projection, not overlapping subterminal lamella.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) of sclerotised parts mostly dark reddish brown; leg I slightly darker than other legs; membranous parts of opisthosoma light grey-orange. Clypeus with long, distally widened and flattened median process projecting forward and slightly upward, occupying about 20% of carapace length (Fig. 4A-B). Fovea indistinct and narrow. Total length 10.2. Carapace 5.6 long, 2.7 wide. Eye sizes and interdistances: PME 0.26 long, separated by 0.19; ALE 0.27 long; ALE-PLE 0.07; PLE 0.27 long, separated by 1.26. Labium 0.7 long, 1.1 wide. Sternum 2.9 long, 2.0 wide. Chelicerae without hump at distolateral corner, with two distinct teeth on anterior margin of fang furrow.

Palp 3.6 long (1.2+0.6+1.1+0.7). Cymbium of typical shape (Fig. 5C). Bulbus globular; embolus large, only slightly bent in its distal portion, apex deeply split: subterminal lamella quite deep, rounded and tongue-shaped, separated by an acute invagination from the much shallower and pointed embolic part (Fig. 5A-B).

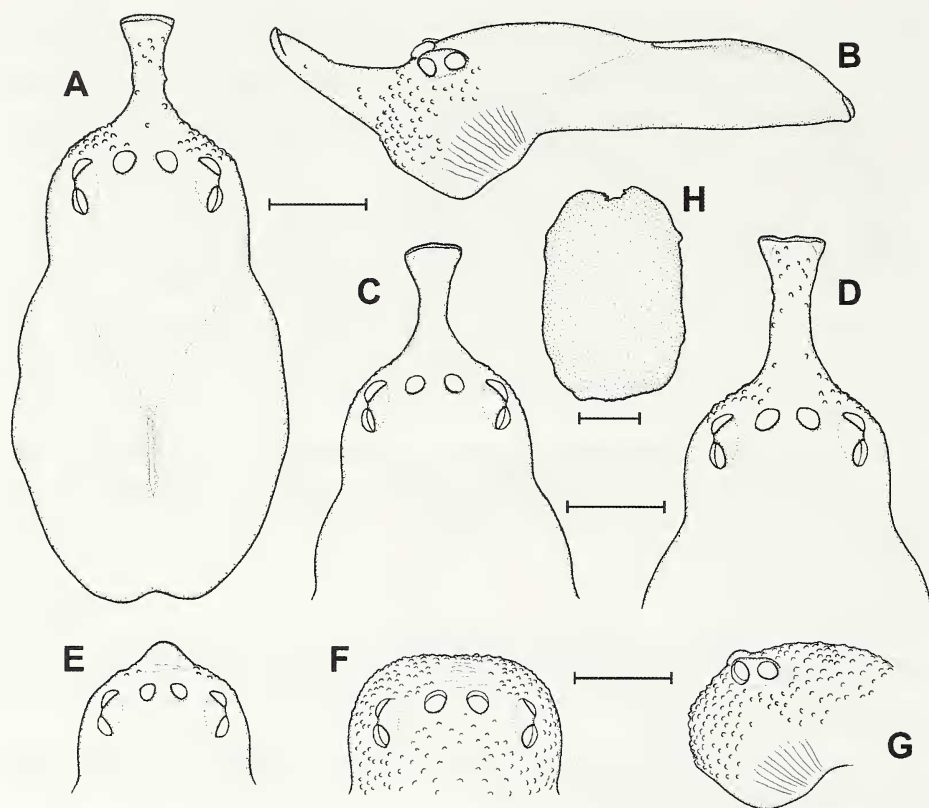


FIG. 4

Perania ferox sp. n. (A) Carapace of male holotype, dorsal view. (B) Same, lateral view. (C, D) Anterior portion of carapace of two male paratypes, dorsal view. (E) Same of penultimate male (exuvia). (F) Anterior portion of carapace of female "allotype", dorsal view. (G) Same, lateral view. (H) Dorsal opisthosomal scutum of "allotype", dorsal view. Scale lines 1.0 mm (A-B; C-D; E-G; H).

Legs 3421. About 12 strong dark conical setal bases prolaterally to ventrally on metatarsus I, about 10 smaller ones prolaterally spread over most of tibia I. Paired leg claws with a row of 9-13 teeth (decreasing in numbers from anterior to posterior legs); unpaired leg claws with one denticle. Leg I 15.5 long (4.7+1.8+4.5+3.1+1.4), leg II 12.5 long (3.7+1.4+3.4+2.7+1.3), leg III 9.6 long (2.9+1.1+2.2+2.3+1.1), leg IV 12.3 long (3.6+1.2+3.2+3.1+1.2).

Opisthosoma 4.6 long, 3.0 wide. Dorsal scutum 4.4 long, 2.9 wide, somewhat oval, its surface with only very indistinct elevations. All lateral microscerites flat, those in upper three bands on posterior margin of opisthosoma still fused into strap-like horizontal plates. Pulmonary plate 3.2 long, 2.5 wide; genital region flat. Anterior pair of ventrolateral plates completely free, their posterior tips only touching margin of pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate 0.3 long, 1.0 wide,

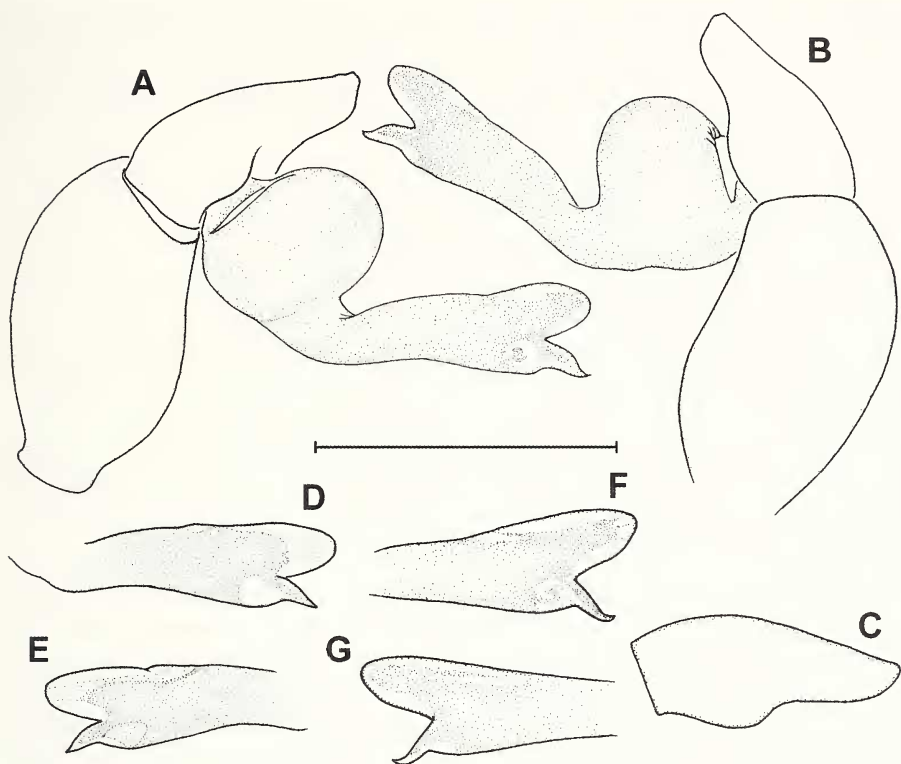


FIG. 5

Perania ferox sp. n. (A) Left palp of holotype, proventral view. (B) Same, retrodorsal view. (C) Left cymbium of holotype, prolateral view. (D, F) Apex of embolus of two male paratypes, prolateral view. (E, G) Same, retrodorsal view. Scale line 1.0 mm.

quadrangular, all margins uneven, the posterior one more distinctly arched than the others. Anal plate 0.9 long, 1.3 wide.

DESCRIPTION OF FEMALE ("allotype"; not dissected): As in male, except for the following. Total length 8.7. Carapace 4.3 long, 2.7 wide; "cephalic" portion domed, anterior margin straight, without clypeal process (Fig. 4F-G). PME 0.25 long, 0.20 apart; ALE 0.22 long; ALE-PLE 0.10; PLE 0.24 long, 1.39 apart. Labium 0.8 long, 1.1 wide. Sternum 2.7 long, 2.0 wide. Right chelicera with two strong teeth on anterior margin of fang furrow, left chelicera with one strong and one weak tooth. Palp 3.6 long (1.1+0.5+0.8+1.2). Legs 3241; tibia I and metatarsus I without conical setal bases. Paired leg claws with a row of 11-12 teeth on anterior legs, 8-10 on posterior legs. Leg I 12.8 long (3.8+1.5+3.5+2.7+1.3), leg II 10.8 long (3.1+1.3+2.8+2.4+1.2), leg III 8.7 long (2.6+1.1+2.0+2.0+1.0), leg IV 11.2 long (3.3+1.2+2.8+2.8+1.1).

Opisthosoma 5.3 long, 3.5 wide; several microplates posterolaterally very distinctly elevated and conical, those on posterior side of opisthosoma flat, very close to each other, but not fused into horizontal strap-like plates. Anterior plate fragmented

into microplates of different sizes. Dorsal scutum 3.5 long, 2.4 wide, subquadrangular (in contrast to ovoid dorsal scutum of *P. birmanica* holotype, Fig. 4H cf. Fig. 3C). Pulmonary plate 2.6 long, 2.5 wide; genital region almost flat, its posterior margin slightly convex. Four laterally extended microplates in front of anal plate, the latter 9.1 long, 1.3 wide.

Vulva (of paratypes) with short anterior collar with moderately arched (or widely angular) anterior margin and straight posterior margin; collar not or only slightly surpassing anterior margin of spermathecae. Ventral side of vulva almost completely pigmented. Spermathecae short, wide and slightly bulged, indistinctly separated from each other by a more or less pronounced, quite shallow median invagination in common anterior margin and by oblique unpigmented bands medially on ventral surface; porepatches narrow and marginal, on convex surface, not lying in trenches (Fig. 6).

REMARK ON JUVENILES: In mature specimens the carapace is firmly connected to the sternum by lateral bridge-sclerites between the leg coxae. In juveniles these connections are not yet in place. The last exuvia of a male paratype has split open along the carapace margin as usual in spiders.

VARIATION: Carapace length in three males (four females) ranges 5.3-6.1 (4.2-4.6), carapace width 2.6-3.0 (2.7-2.9). In the holotype and one male paratype the posterior tips of the anterior pair of ventrolateral plates are only touching the margin of the pulmonary plate, in a second male paratype they are fused with it. One male paratype has all strap-like horizontal plates on the posterior side of the opisthosoma broken. For variation in the shape of the palpal organ of three males (mostly expressed in the angle between the dorsal subterminal lamella and the ventral embolic part) see Fig. 5A-G; for variation in copulatory organs of two females see Fig. 6. The postgenital plate is completely fused to the pulmonary plate in two males (including the holotype) and medially separated by a small membranous stripe behind the gonopore in one male. The females examined have 3-4 laterally extended microplates (fragments of the preanal plate) in front of their anal plate.

RELATIONSHIPS: Judging from strong similarities in copulatory organs of females, *P. ferox* sp. n. is most closely related to *P. birmanica* and *P. quadrifurcata* sp. n. The embolus of *P. ferox* sp. n. is less complex than that of *P. quadrifurcata* sp. n. but of similar overall shape. The geographical proximity of these two species and *P. birmanica* on both sides of the border between Thailand and Myanmar (see Fig. 1, localities 12, 13, 16-19) also suggests a close relationship.

DISTRIBUTION: Known only from the type locality in western central Thailand, close to the border with Myanmar's Kayin (= Karen) State (Fig. 1, locality 13).

BIOLOGY: The spiders examined were collected from steep banks of a small stream in an evergreen hill forest at 1270 m. They lived in loose-meshed sheetwebs running into a retreat as typical for *Perania*. One female used the abandoned burrow of a *Liphistius* female (with an intact exuvia at the bottom) as its retreat. Two *P. ferox* sp. n. females had newly shed exuviae in their webs when collected in early October. One juvenile male matured at the end of January. It continued to feed for about three

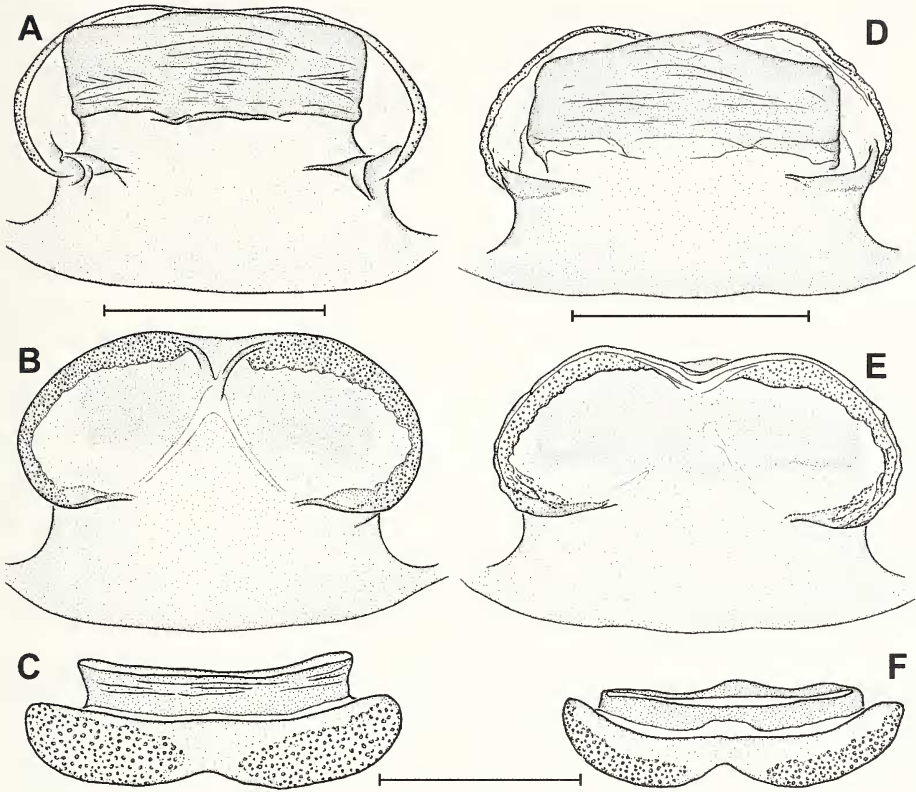


FIG. 6

Perania ferox sp. n., two female paratypes. (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C, F) Same, anterior view. Scale lines 0.5 mm (A-B; D-E; C, F).

months, but then refused prey and died four months into maturity. When collected, the spiders reacted unusually aggressively for *Perania*: threatening by raising their anterior legs (as theraphosid spiders do) and biting the forceps.

Perania tumida sp. n.

Figs 7-8

HOLOTYPE: MHNG, sample TH-05/21; ♂ (matured 27.X.2006; exuvia preserved); Thailand, Uttaradit Province, Nam Pat District, Phu Soi Dao (= Phu Soay Dao) National Park, rivulet below Lan Son (17°42'N, 100°57'E), 1600 m; 22.XII.2005; leg. P. J. Schwendinger.

PARATYPES: 3 ♀ (one moulted 10.III.2006 and matured 27.X.2006) with same data as for holotype.

ETYMOLOGY: Latin adjective “tumidus, -a, -um” (= swollen). The species epithet refers to the clypeal hump of females in this species.

DIAGNOSIS: Similar to *P. nasicornis*, distinguished by: Males with apically slightly narrower clypeal process and with strap-like horizontal plates posteriorly on opisthosoma; cymbium with shorter apex; palpal organ with proximally narrower/shal-

lower embolus carrying two lobate and one digitiform projections on deep apex. Females with a small clypeal hump and with conical dorsolateral microplates in posterior half of opisthosoma; vulva with spermathecae more extensively connected to each other in the middle; anterior collar with widely angular distal margin.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) of prosoma, chelicerae, palps, proximal articles of leg I and anal plate dark brown, other sclerites reddish brown; membranous parts of opisthosoma light grey-brown. Clypeus with long, distally widened and flattened median process projecting forward and slightly upward, occupying almost 30% of carapace length (Fig. 7A-B). Fovea indistinct and narrow. Total length 11.8. Carapace 6.7 long, 2.9 wide. Eye sizes and interdistances: PME 0.32 long, separated by 0.13; ALE 0.26 long; ALE-PLE 0.07; PLE 0.31 long, separated by 1.21. Labium 0.9 long, 1.2 wide. Sternum 2.8 long, 2.1 wide. Chelicerae without modifications; with one distinct and one indistinct tooth on anterior margin of fang furrow.

Palp 4.0 long (1.3+0.6+1.2+0.9). Cymbium (Fig. 7I) of typical shape, apex slightly shorter than in species previously described from Thailand. Bulbus globular; embolus large, distal half distinctly deeper than proximal half, apex split: lobate sub-terminal lamella with straight distal margin, overlapping deep embolic part with a narrowly rounded, lobate dorsal projection, a widely rounded lobate median projection and a small digitiform ventral projection (Fig. 7G-H).

Legs 3421. About 20 dark conical setal bases proventrally and ventrally on metatarsus I, about 10 shorter ones proventrally and ventrally in distal half of tibia I. Paired leg claws with a row of 14-16 teeth on anterior legs, 10-11 on posterior legs; unpaired leg claws with one denticle. Leg I 18.5 long (5.5+1.9+5.5+4.0+1.6), leg II 15.1 long (4.4+1.6+4.3+3.4+1.4), leg III 11.4 long (3.5+1.2+2.7+2.8+1.2), leg IV 14.6 long (4.3+1.3+3.8+3.9+1.3). Right leg I malformed (probably regenerated): with tibia, metatarsus and tarsus shorter and thicker than on left side, without conical setal bases.

Opisthosoma 5.1 long, 3.3 wide. Dorsal scutum 4.8 long, 3.3 wide, somewhat oval, its surface with indistinct elevations. Posterior side of opisthosoma with one strap-like horizontal plate just behind dorsal scutum. Pulmonary plate 3.4 long, 2.8 wide; genital region flat. Anterior pair of ventrolateral plates in males largely free, only their posterior tips fused with pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate 0.3 long, 0.9 wide, quadrangular, its anterior margin widely arched, its posterior and lateral margins straight. Anal plate 1.0 long, 1.5 wide.

DESCRIPTION OF FEMALE ("allotype"; not dissected): As in male, except for the following. Colour generally darker. Total length 11.3. Carapace 5.5 long, 3.1 wide; "cephalic" portion domed, with a short and basally wide conical hump on clypeus (Fig. 7C-D). PME 0.21 long, 0.24 apart; ALE 0.28 long; ALE-PLE 0.09; PLE 0.30 long, 1.54 apart. Labium 0.9 long, 1.3 wide. Sternum 3.2 long, 2.2 wide. Palp 4.6 long (1.3+0.6+1.1+1.6). Legs 3421; no conical setal bases on tibia I and metatarsus I, but with slightly enlarged setal bases ventrally on metatarsus I. Paired leg claws with a row of 12-15 teeth. Leg I 18.3 long (5.5+1.9+5.3+3.9+1.7), leg II 15.5 long (4.5+1.7+4.3+3.5+1.5), leg III 12.3 long (3.8+1.4+2.9+3.0+1.2), leg IV 15.3 long (4.6+1.5+4.0+3.9+1.3).

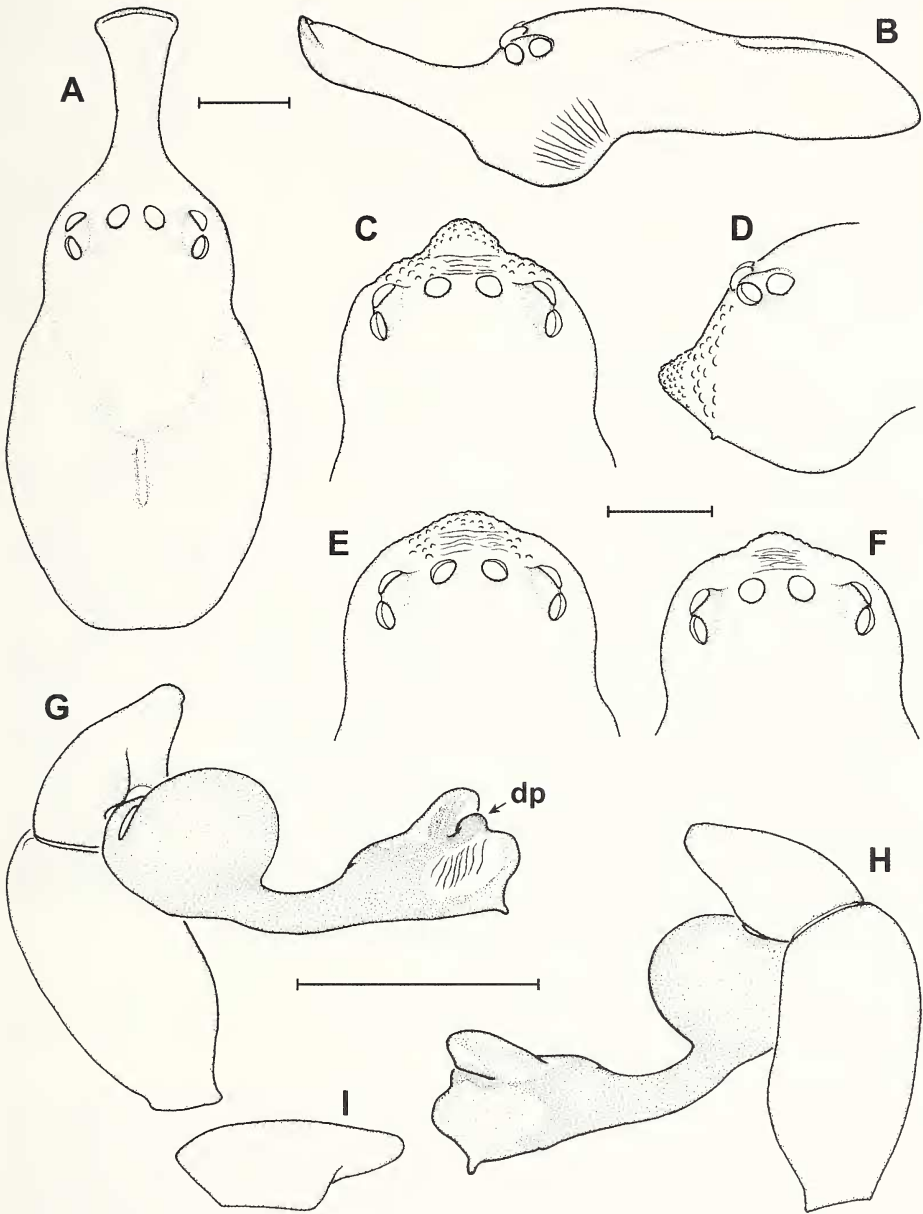


FIG. 7

Perania tumida sp. n. (A) Carapace of male holotype, dorsal view. (B) Same, lateral view. (C) Anterior portion of carapace of female "allotype", dorsal view. (D) Same, lateral view. (E, F) Anterior portion of carapace of two female paratypes, dorsal view. (G) Left palp of holotype, proventral view. (H) Same, retrodorsal view. (I) Left cymbium of holotype, prolateral view. Abbreviation: dp = dorsal projection on embolic part of apex of palpal organ. Scale lines 1.0 mm (A-B; C-F; G-I).

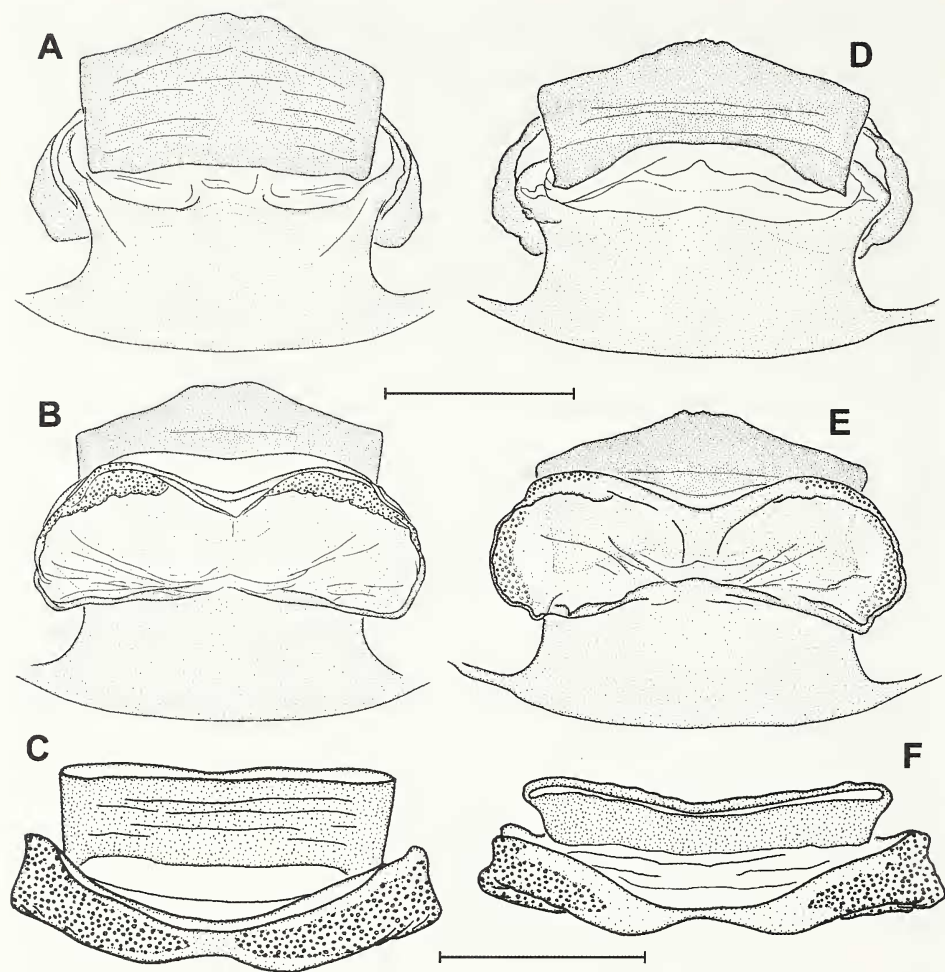


FIG. 8

Perania tumida sp. n., two female paratypes. (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C, F) Same, anterior view. Scale lines 0.5 mm (A-B, D-E; C, F).

Opisthosoma 7.2 long, 4.0 wide; microplates in posterior half (especially dorsally) larger than others, conical and distinctly elevated. Dorsal scutum 5.4 long, 3.0 wide, narrower and with higher surface elevations than in male, especially along mid-line and in posterior portion. Pulmonary plate 3.1 long, 3.2 wide; genital region slightly more elevated than in male. Three slightly enlarged and laterally fused microplates anterior to anal plate; the latter 1.3 long, 1.5 wide.

Vulva (of paratypes) with fairly long anterior collar with angular anterior margin. Spermathecae and ventral wall of genital atrium uniformly pigmented. Spermathecae wide, slightly bulged; common anterior margin with a distinct median invagination; posterior margin more or less straight; lateral margins arched, postero-lateral corners angular; narrow marginal poreplates lying in shallow trenches in

anterior and lateral sides of spermathecae; ventral surface of spermathecae with oblique wrinkles in posterior portion (Fig. 8).

REMARK ON JUVENILES: The last exuvia of the male holotype has a clypeal hump very similar (only slightly wider) to that of the female "allotype".

VARIATION: Carapace length in the three females examined ranges 4.9-5.5, carapace width 2.9-3.1. The clypeal hump of females is more pronounced in larger specimens than in smaller ones (Fig. 7C-F). One of the two vulvae examined has a shorter anterior collar than the other, otherwise both vulvae are very similar (Fig. 8). In the two female paratypes the slightly enlarged microplates that represent remnants of the preanal plate are not laterally fused as in the "allotype".

RELATIONSHIPS: Strong similarities in male and female copulatory organs indicate closest relationship between *P. tumida* sp. n. and *P. nasicornis*.

DISTRIBUTION: Known only from the type locality, a mountain over 2100 m high, at the border between Thailand and Laos (Fig. 1, locality 14). As the types were actually collected only a few hundred metres from a boundary marker, it is safe to assume that this species also occurs on the eastern slopes of the same mountain which lie in Xaignabouri Province, Laos.

BIOLOGY: The types were collected from the banks of a small seasonal stream in an evergreen gallery forest below a savannah with pine trees. The spiders lived in irregular loose sheetwebs running into a retreat in holes. No males were found in late December. The male holotype matured in captivity at the beginning of April, one of the female paratypes in late October of the following year.

Perania egregia sp. n.

Figs 9-11

HOLOTYPE: MHNG; ♂; Thailand, Phetchabun Province, Lom Sak District, Nam Nao National Park, rivulet near park headquarters (16°44'33"N, 101°34'13"E), 850 m; 24.XII.1994; leg. P. J. Schwendinger.

PARATYPES: MHNG; 1 ♂, 6 ♀ (one selected as "allotype", not dissected) (collected 21.X.1993) and 2 ♂ (collected 24.XII.1994); all from the type locality; leg. P. J. Schwendinger.

ETYMOLOGY: Latin adjective "egregius, -a, -um" (= outstanding, distinguished). The species epithet refers to the unusual palpal characters of males of this species.

DIAGNOSIS: Males different from those of all congeners by the unique male palp with a short truncate cymbium and a short thick palpal organ. Females similar to those of *P. tumida* sp. n., distinguished by tibia I and metatarsus I ventrally with conical setal bases and by vulva with longer anterior collar and rounded posterolateral corners of spermathecae.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) generally brown, carapace, chelicerae and ventral sclerites dark brown; membranous parts of opisthosoma light grey-brown. Clypeus with long, distally widened and flattened median process projecting forward and slightly upward, occupying 27% of carapace length (Fig. 9A-B). Fovea indistinct and narrow. Total length 10.2. Carapace 5.6 long, 2.5 wide. Eye sizes and interdistances: PME 0.27 long, separated by 0.12; ALE 0.24 long;

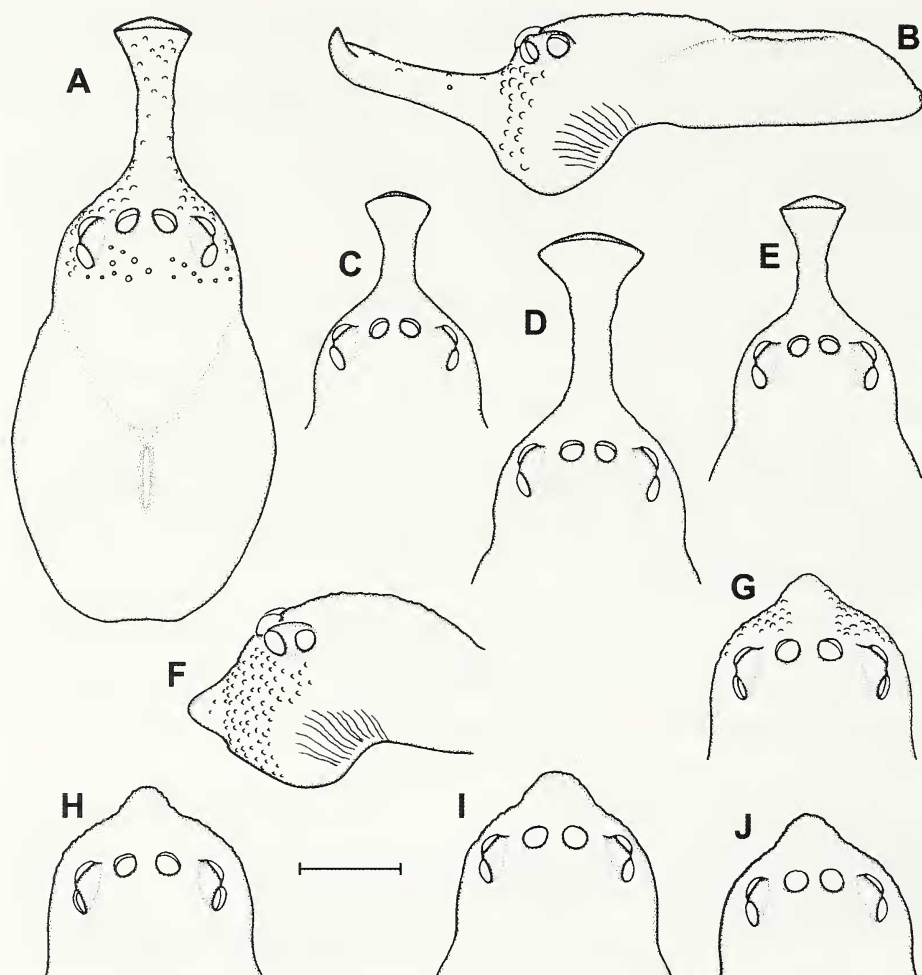


FIG. 9

Perania egregia sp. n. (A) Carapace of male holotype, dorsal view. (B) Same, lateral view. (C-E) Anterior portion of carapace of three male paratypes, dorsal view. (F) Anterior portion of carapace of female "allotype", lateral view. (G) Same, dorsal view. (H-J) Anterior portion of carapace of three female paratypes, dorsal view. Scale line 1.0 mm.

ALE-PLE 0.07; PLE 0.25 long, separated by 1.02. Labium 0.7 long, 1.0 wide. Sternum 2.6 long, 1.8 wide. Chelicerae without modifications; with two teeth on anterior margin of fang furrow.

Palp 3.4 long (1.3+0.6+1.0+0.5). Cymbium (Fig. 10D, see also Fig. 10C for male paratype) short, with widely truncate, indistinctly bilobate apex (unlike in any other *Perania* species). Palpal organ strongly modified: bulbus and base of embolus of same thickness, without constriction but with only a pallid zone between them; apex of embolus deeply split; lobate, narrowly rounded subterminal dorsal lamella separated

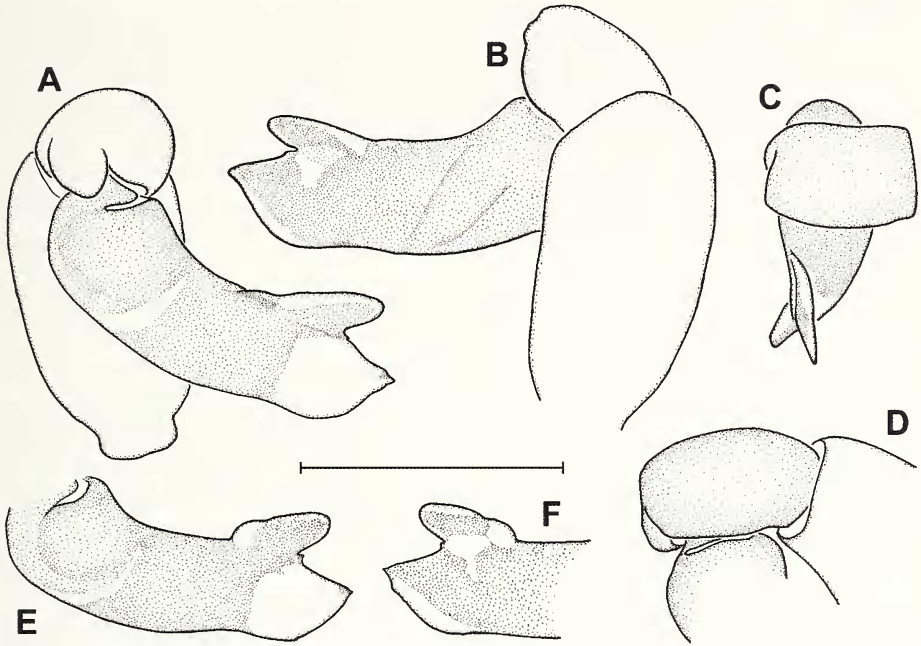


FIG. 10

Perania egregia sp. n. (A) Left palp of male paratype, proventral view. (B) Same, retrodorsal view. (C) Left cymbium and palpal organ of same male, dorsal view. (D) Left cymbium of holotype, retrolateral view. (E) Left palpal organ of holotype, proventral view. (F) Apex of embolus of holotype, retrodorsal view. Scale line 1.0 mm.

by a V-shaped invagination from widely triangular embolic part; a tiny tooth at base of invagination between both apical parts (Fig. 10E-F).

Legs 3421. About 25 dark conical setal bases of various sizes prolaterally to ventrally on metatarsus I, about 15 shorter ones proventrally on tibia I. Paired leg claws with a row of 9-12 teeth; unpaired leg claws with one denticle. Leg I 14.9 long ($4.6+1.6+4.3+3.1+1.3$), leg II 12.0 long ($3.6+1.3+3.3+2.6+1.2$), leg III 9.0 long ($2.8+1.0+2.2+2.1+0.9$), leg IV 11.9 long ($3.6+1.1+3.1+3.0+1.1$).

Opisthosoma 4.8 long, 3.2 wide. Dorsal scutum 4.1 long, 2.6 wide, somewhat oval, quite smooth, its surface with only few indistinct elevations. All lateral microscerites flat, those in bands on posterior side of opisthosoma closely packed but not fused into horizontal plates. Pulmonary plate 3.2 long, 2.8 wide; genital region flat. Anterior pair of ventrolateral plates completely free, their posterior tips only touching margin of pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, both linked by a sclerotised suture. Preanal plate 0.4 long, 1.0 wide, somewhat elliptical. Anal plate 0.9 long, 1.2 wide.

DESCRIPTION OF FEMALE ("allotype"; not dissected): As in male, except for the following. Membranous parts of opisthosoma lighter, especially in anterior half. Total length 9.3. Carapace 4.3 long, 2.5 wide; "cephalic" portion domed, with a distinct

conical hump on clypeus occupying about 6% of carapace length (Fig. 9F-G). PME 0.27 long, 0.15 apart; ALE 0.24 long; ALE-PLE 0.09; PLE 0.24 long, 1.26 apart. Labium 0.7 long, 1.0 wide. Sternum 2.4 long, 1.8 wide. Second tooth on anterior margin of cheliceral fang furrow indistinct. Palp 3.3 long (1.0+0.5+0.7+1.1). Legs 3241; tibia I with about 10 conical setal bases prolaterally, metatarsus I with about 20 larger ones prolaterally and proventrally, all of them weaker than in males. Paired leg claws with a row of 10-15 teeth. Leg I 12.6 long (3.9+1.3+3.4+2.7+1.3), leg II 10.6 long (3.2+1.2+2.8+2.3+1.1), leg III 8.3 long (2.6+0.9+2.0+1.9+0.9), leg IV 10.7 long (3.3+1.0+2.8+2.6+1.0).

Opisthosoma 5.4 long, 3.5 wide; microplates in posterior half (especially dorsally) larger than others, slightly elevated and wartlike, those on posterior side of opisthosoma close to each other but not forming strap-like horizontal plates. Dorsal scutum 3.5 long, 1.5 wide, its surface with slight elevations (as in males) plus irregular shallow furrows (mostly along margins) and low ridges. Anterior opisthosomal plate completely fragmented into microplates. Pulmonary plate 2.6 long, 2.4 wide; genital region slightly more elevated than in male, its posterior margin widely rounded. Preanal plate completely fragmented into microplates, three of them slightly wider than the others. Anal plate 1.2 long, 1.5 wide.

Vulva (of paratypes) with very long anterior collar, its median zone distinctly lighter than lateral zones. Spermathecae and ventral wall of genital atrium uniformly pigmented. Spermathecae elliptical, with a slight median invagination in common anterior margin; lateral sides with porepatches on flat surface (Fig. 11).

VARIATION: Carapace length in four males (six females) ranges 4.6-6.0 (4.3-4.5), carapace width 2.2-2.6 (2.4-2.6). In the holotype the tiny tooth in the invagination between the subterminal dorsal lamella and the embolic part of the palpal organ is distinct on both palps (Fig. 10E-F), in the male paratypes it is tiny and quite indistinct on one or both palps (Fig. 10A-B). For variation in the vulvae of two females see Fig. 11. For variation in the shape of clypeus modifications of males see Fig. 9A-E, of females see Fig. 9F-J. Two male paratypes have several fused microplates in the uppermost band on the posterior side of the opisthosoma. In all males the postgenital plate is completely fused to the pulmonary plate. In two female paratypes 2-3 microplates in the preanal region are laterally extended; in another female paratype the median microplate is distinctly larger than the nearby ones.

RELATIONSHIPS: The palp of *P. egregia* sp. n. males is strongly autapomorphic, but the distinct clypeal hump and the conical setal bases on tibia I and metatarsus I of females (both latter characters unusual for *Perania* females) and similar vulvae indicate that this species is closely related to *P. tumida* sp. n. and *P. quadrifurcata* sp. n.

DISTRIBUTION: Known only from the type locality in the northeaster region of Thailand (Fig. 1, locality 15).

BIOLOGY: The spiders were found in typical webs built under overhanging edges of earth banks on both sides of a small stream in an evergreen gallery forest with bamboo stands. When collected, the spiders played dead, spread their legs (other spiders then usually retract their legs!) and remained motionless. One of the females

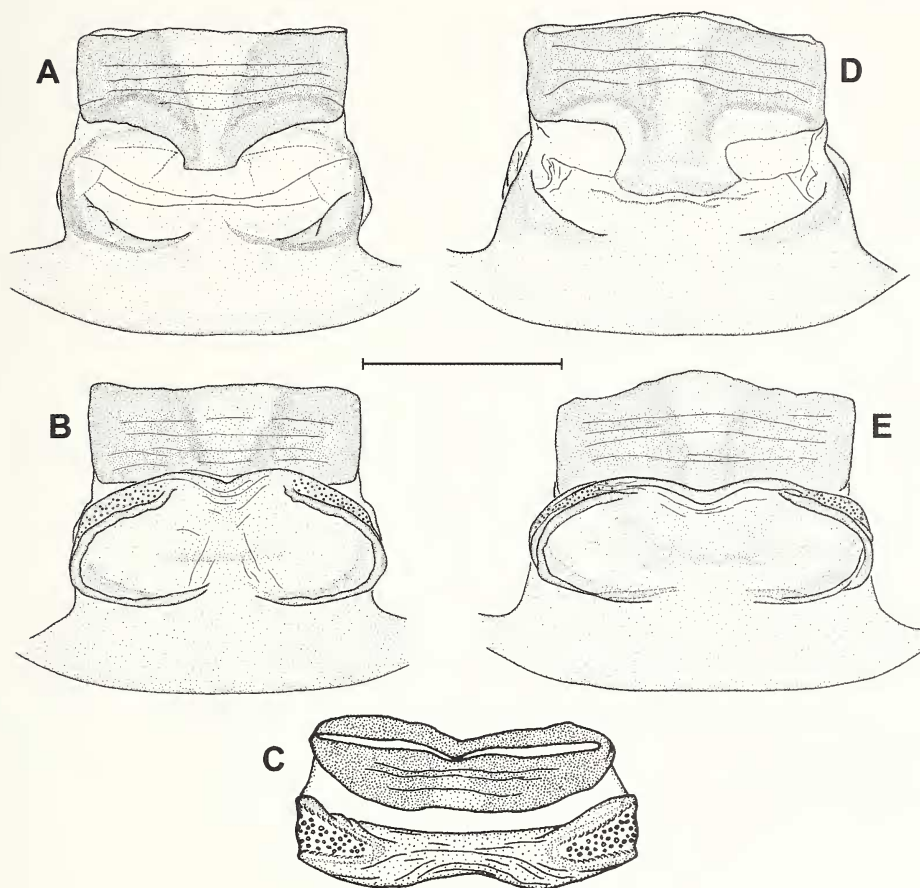


FIG. 11

Perania egregia sp. n., two female paratypes. (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C) Same, anterior view. Scale line 0.5 mm.

collected in late October built three globular egg sacs in captivity between mid-December and early January. These were suspended in the web and contained 19, 14 and 27 grey-brown eggs and spiderlings.

***Perania quadrifurcata* sp. n.**

Figs 12-14, 36H, 37B

HOLOTYPE: MHNG, sample TH-02/01; ♂; Thailand, Kanchanaburi Province, Sai Yok District, Sai Yok Noi Waterfall (14°14'16"N, 99°03'28"E), 200 m; 5.-7.VII.2002; leg. P. J. Schwendinger.

PARATYPES: MHNG, sample TH-02/01; 4 ♂, 4 ♀ (one of them the "allotype"), 1 juv. ♂ collected together with the holotype; leg. P. J. Schwendinger. – MHNG, sample TH-00/06; 3 ♂, 2 ♀; Kanchanaburi Province, Sangkhlaburi District, Daichongthong Waterfall (about 14°59'N, 98°36'E), 200 m; 10.XI.2000; leg. P. J. Schwendinger. – NMP; 3 ♂, 1 ♀; Phetchaburi Province,

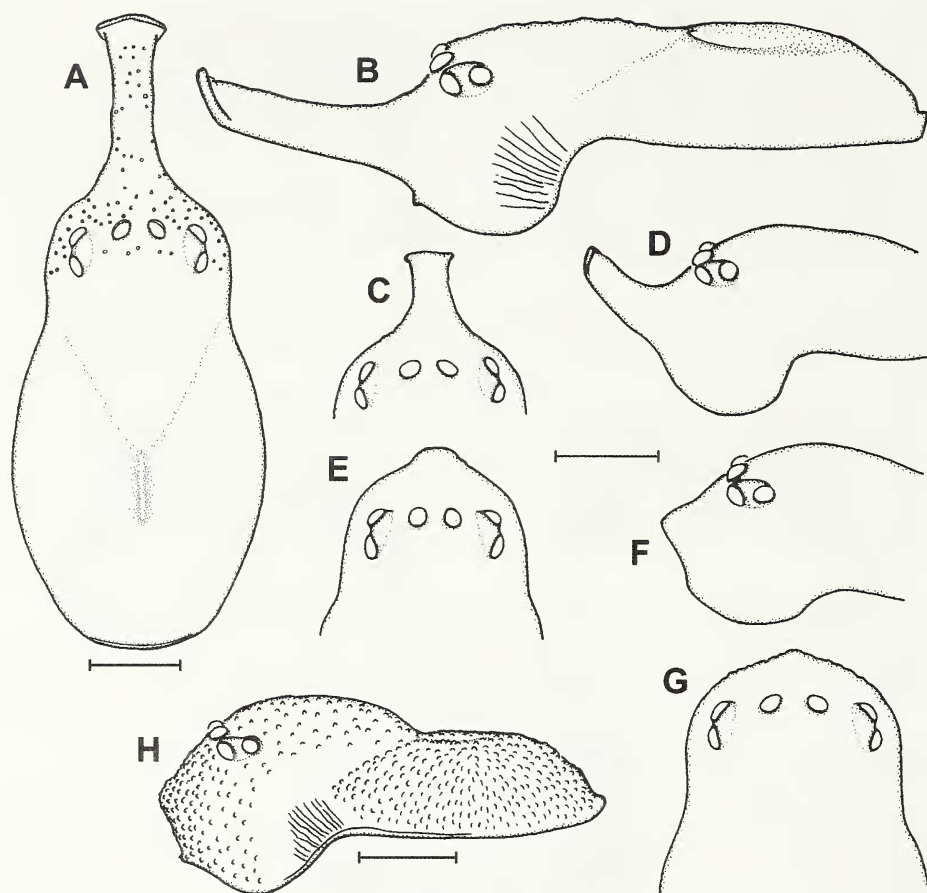


FIG. 12

Perania quadrifurcata sp. n. (A) Carapace of male holotype, dorsal view. (B) Same, lateral view. (C) Anterior portion of carapace of male paratype, dorsal view. (D) Same, lateral view. (E) Anterior portion of carapace of penultimate male, dorsal view. (F) Same, lateral view. (G) Anterior portion of carapace of female "allotype", dorsal view. (H) Entire carapace of "allotype", lateral view. Scale lines 1.0 mm (A-B; C-G; H).

Kaeng Krachan District, Kaeng Krachan National Park, Khao Phanoen Thung, orchid trail (12°53'12"N, 99°21'57"E), 880 m; 4.XII.2011; leg. O. Košulič. – NMP; 1 ♂; Nakhon Ratchasima Province, Wang Nam Khiao District, Sakaerat Biosphere Reserve, Wang Nam Khiao Forestry Training Campus (14°29'44"N, 101°56'17"E), 280 m; 8.XI.2011; leg. O. Košulič.

ETYMOLOGY: Latin adjective "quadrifurcatus, -a, -um" (= 4-forked). The species name refers to the unique shape of the embolus, the apex of which is divided into four tips.

DIAGNOSIS: Similar to *P. ferox* sp. n. Males distinguished by longer clypeal process; five to seven (instead of only three) strap-like horizontal plates on posterior side of opisthosoma; apex of palpal organ with four tips: two long and slender upper

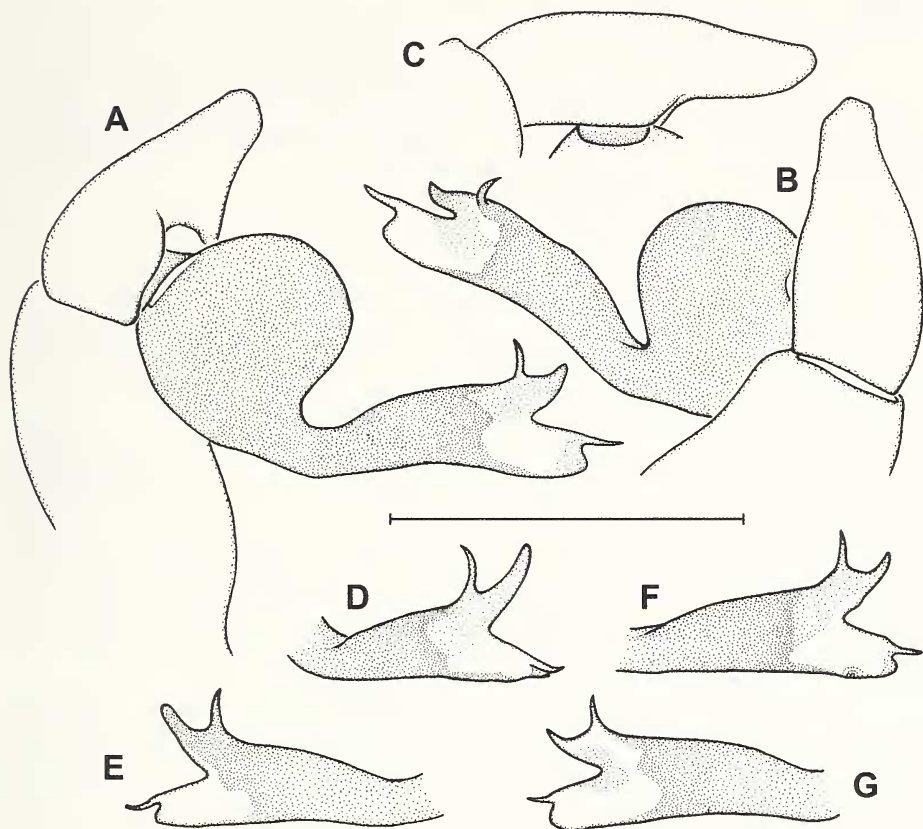


FIG. 13

Perania quadrifurcata sp. n. (A) Left palp of holotype, proventral view. (B) Same, retrodorsal view. (C) Left cymbium of holotype, prolateral view. (D, F) Apex of embolus of two male paratypes from the type locality; proventral view. (E, G) Same, retrodorsal view. Scale line 1.0 mm.

tips (corresponding to subterminal lamella), and a long and slender pointed tip plus a short rounded lobe (corresponding to embolic part). Females distinguished from those of *P. ferox* sp. n. by the presence of conical setal bases ventrally on metatarsus I (in some females also on tibia I); vulva wider, spermathecae with a pair of posterolateral compartments and with shallow trenches on anterior and lateral sides, without oblique unpigmented bands on ventral surface.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) of sclerotised parts mostly dark reddish brown, carapace even darker; membranous parts of opisthosoma light grey-orange. Clypeus with long, distally widened and flattened median process projecting forward and slightly upward, occupying almost 30% of carapace length (Fig. 12A-B). Fovea indistinct and narrow. Total length 12.4. Carapace 6.8 long, 2.7 wide. Eye sizes and interdistances: PME 0.27 long, separated by 0.17; ALE 0.25 long; ALE-PLE 0.09; PLE 0.25 long, separated by 1.21. Labium 0.9 long, 1.1 wide. Sternum

3.0 long, 2.0 wide. Chelicerae without modifications; one distinct and one indistinct tooth on anterior margin of fang furrow.

Palp 3.8 long (1.2+0.6+1.1+0.9). Cymbium of typical shape (Fig. 13C). Bulbus globular; embolus with deeply divided apex carrying four tips: subterminal dorsal lamella split into two shallow, pointed upper tips bent dorsad, one being slightly thinner than the other; embolic part separated from subterminal lamella by a widely V-shaped invagination; embolic part split into a shallow, pointed sigmoid lower tip above a much shorter, deeper, rounded lobe, both of them directed distad (Fig. 13A-B).

Legs 3421. About 30 dark conical setal bases (Fig. 36H) proventrally and ventrally on metatarsus I, about 20 proventrally and ventrally in distal half of tibia I. Paired leg claws with a row of 11-16 teeth (decreasing in numbers from anterior to posterior legs); unpaired leg claws with one denticle. Leg I 19.0 long (5.8+2.0+5.8+3.9+1.5), leg II 14.9 long (4.4+1.6+4.2+3.4+1.3), leg III 11.1 long (3.4+1.3+2.9+2.4+1.1), leg IV 14.8 long (4.6+1.3+4.0+3.7+1.2).

Opisthosoma 5.9 long, 4.0 wide. Dorsal scutum 5.3 long, 3.4 wide, somewhat oval, its surface with low elevations. Posterior side of opisthosoma with five strap-like horizontal plates. Pulmonary plate 3.7 long, 2.8 wide; genital region flat. Anterior pair of ventrolateral plates completely free, not connected to pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate 0.5 long, 0.9 wide, quadrangular, its anterior margin widely arched, its posterior and lateral margins straight. Anal plate 1.0 long, 1.3 wide.

DESCRIPTION OF FEMALE ("allotype"; dissected): As in male, except for the following. Total length 7.5. Carapace 4.6 long, 2.7 wide; "cephalic" portion domed, with a short and basally wide, somewhat pointed hump on clypeus (Fig. 12G-H). PME 0.21 long, 0.24 apart; ALE 0.20 long; ALE-PLE 0.09; PLE 0.21 long, 1.41 apart. Labium 0.8 long, 1.1 wide. Sternum 2.7 long, 1.8 wide. Palp 3.1 long (0.7+0.5+0.8+1.1). Legs 32=41; tibia I with about 20 conical setal bases prolaterally and proventrally, metatarsus I with about 30 slightly larger ones in the same position, all of them smaller than in males. Leg I 15.1 long (4.5+1.6+4.3+3.3+1.4), leg II 12.8 long (3.8+1.4+3.5+2.9+1.2), leg III 9.9 long (3.0+1.1+2.4+2.4+1.0), leg IV 12.8 long (3.9+1.2+3.4+3.2+1.1). Paired leg claws with a row of 15 teeth on anterior legs, 7-10 on posterior legs.

Opisthosoma 5.9 long, 4.2 wide; microplates in posterior half of dorsal side distinctly elevated and conical, those on posterior side of opisthosoma less elevated, very close to each other but not forming strap-like horizontal plates. Dorsal scutum 2.7 long, 1.6 wide, with relief slightly higher than in male. Anterior opisthosomal plate completely fragmented into microplates. Pulmonary plate 2.8 long, 2.6 wide; genital region almost flat, its posterior margin more rounded than in male. Preanal plate completely fragmented into microplates. Anal plate 1.1 long, 1.3 wide.

Vulva (Fig. 14C) with short anterior collar not surpassing anterior margin of wide spermathecae. Spermathecae and ventral wall of genital atrium uniformly pigmented. Spermathecae largely fused in the middle, their common anterior margin indistinctly invaginated. Each posterolateral corner of spermathecae with a sac-like compartment distinctly separated from anterior portion of spermathecae. Narrow

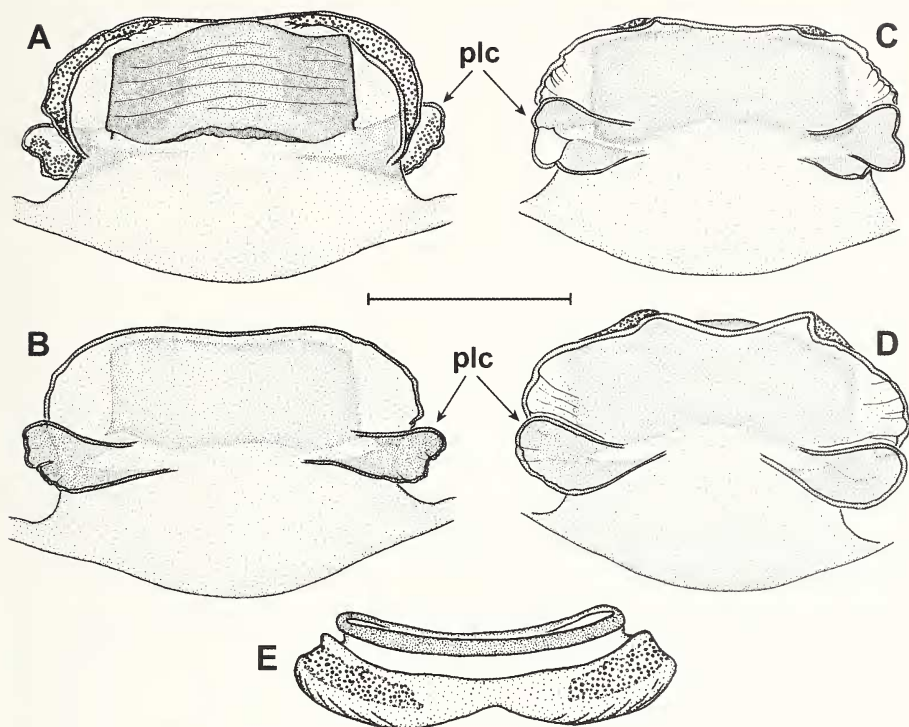


FIG. 14

Perania quadrifurcata sp. n., females; paratype from the type locality (A-B), "allotype" (C), paratype from Daichongthong (D-E). (A) Vulva, dorsal view. (B-D) Same, ventral view. (E) Same, anterior view. Abbreviation: plc = posterolateral compartment of spermatheca. Scale line 0.5 mm.

marginal porepatches on slightly concave surface lying in shallow trenches (see Fig. 14E for paratype).

VARIATION: Carapace length in twelve males (seven females) ranges 4.9-6.8 (4.4-5.0), carapace width 2.5-2.9 (2.6-3.0). The clypeal process in males is usually long (Fig. 12A-B), only in one male from Sai Yok Noi (the type locality) it is short and apparently malformed (Fig. 12C-D). All females, except one from Daichongthong, have a basally wide, conical, pointed hump on the clypeus (Fig. 12G-H). A very similar but in dorsal view more apically rounded hump is also present in a penultimate male (Fig. 12E-F). Females from Sai Yok have distinct conical setal bases ventrally on tibia I and metatarsus I; the two females from Daichongthong have only very indistinct ones on metatarsus I, none on tibia I; the female from Kaeng Krachan has none on leg I. In all males from Daichongthong and in the holotype from Sai Yok the postgenital plate is anteriorly completely fused to the pulmonary plate, in three males from Sai Yok it is anteromedially separated by a membranous stripe, and in a fourth male (from Sai Yok) it is anteromedially and anterolaterally separated. The preanal plate is absent in the

"allotype" (from Sai Yok), indistinctly developed in three females from Sai Yok, rudimentary but quite distinct in the two females from Daichongthong. Two of the four vulvae examined have an indistinctly outlined, very lightly pigmented central area in the ventral wall between the spermathecae and the genital atrium (possibly homologous with the oblique unpigmented bands on the spermathecae of *P. ferox* sp. n.). All males possess five distinct (plus two rather less distinct) strap-like horizontal plates posteriorly on the opisthosoma.

RELATIONSHIPS: The very complex apex of the embolus of *P. quadrifurcata* sp. n. is unique and probably evolved by a subdivision of the two parts (subterminal lamella and embolic part) of a bifid apex. Within the *nasuta*-group only *P. ferox* sp. n. and *P. egregia* sp. n. (males of *P. birmanica* are unknown) also lack a lobate dorsal projection on the embolic part. Strong similarities in the vulvae of *P. quadrifurcata* sp. n., *P. ferox* sp. n. and the holotype of *P. birmanica* indicate a very close relationship between these three species.

DISTRIBUTION: Known from two localities (about 100 km apart) in Kanchanaburi Province and from one locality about 150 km further south in Phetchaburi Province, all in western central Thailand, as well as from one locality on the Khorat Plateau in northeastern Thailand (Fig. 1, localities 16-19). The latter locality (represented by a single male collected by O. Košulič) is about 300 km away from the type locality (which is also the closest of the other three localities) and needs to be confirmed by additional specimens.

BIOLOGY: This species lives in the central and northeastern regions of Thailand, which are seasonally dry. All spiders were collected in the lowlands, in semi-evergreen lowland forest (Kaeng Krachan), evergreen gallery forest near streams and waterfalls (Sai Yok Noi, Daichongthong), and in mixed evergreen-deciduous forest (Sakaerat). Thus the habitats of this species are relatively humid and shaded. The spiders built irregular loose sheetwebs with a retreat in holes or cracks in earthbanks or limestone rocks covered by moss. In early July (at the type locality) two males were found at night courting in webs of females; one male was then newly moulted and had its last exuvia hanging in the web. Not longer afterwards a female produced an egg cluster in captivity and suspended it in the web as described for *P. siamensis* (Schwendinger, 1994: 455-456).

THE *PERANIA CERASTES* SPECIES GROUP

DIAGNOSIS: Similar to the *robusta*-group. Characterized by the presence of proximally swollen, strongly sigmoid setae on slightly raised bases on the ventral side of metatarsus I (Fig. 36G) in both sexes. Fovea anteriorly slightly wider and deeper than posteriorly in both sexes. Females possessing vulvae with an entirely or partly pigmented ventral wall of the genital atrium; spermathecae with distinctly outlined porepatches extending only little onto the dorsal side of the vulva; posterior area of spermathecae unpigmented. Males with long clypeal process, either digitiform (in *P. cerastes*) or hourglass-shaped with a strongly rounded distal margin in dorsal view (in *P. coryne*); chelicerae unmodified (in *P. cerastes*) or with a median-retrolateral cheliceral boss (in *P. coryne*); embolus of male palpal organ with bifid apex, sub -

terminal lamella smaller than embolic part. Anterior pair of ventrolateral plates in males completely or largely free. Femora of legs and palps in males granular.

SPECIES INCLUDED: *Perania cerastes*, *P. coryne*.

DISTRIBUTION: Peninsular Malaysia (Fig. 1, localities 20-24).

***Perania cerastes* Schwendinger, 1994**

Figs 15-16, 36G

Perania cerastes Schwendinger, 1994: 456-458, figs 26-34 (descriptions of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Malaysia (peninsula), Perak, Taiping, Maxwell Hill (= Bukit Larut; about 4°52'N, 100°48'E), 1200 m; 5.II.1991; leg. P. J. Schwendinger.

PARATYPES: MHNG; 2 ♂, 2 ♀; same data as for holotype.

NEW MATERIAL EXAMINED: MHNG; 1 ♀; from the type locality, road between Bukit Larut Guesthouse and summit (4°51.694'N, 100°47.631'E), 900-1380 m; 24.IX.2001; leg. L. Monod. – MHNG; 1 ♂; Malaysia (peninsula), Perak, Gua Kanthan (4°45'41"N, 101°07'19"E), 60 m, in dark part of cave; 15.XII.1997; leg. P. J. Schwendinger. – MHNG; 4 ♂, 1 ♀; Malaysia (peninsula), Perak, Gua Tempurung (4°24'59"N, 101°11'13"E), 40 m, in dark part of cave; 13.XII.1997; leg. P. J. Schwendinger. – MHNG; 2 ♂, 3 ♀; Malaysia (peninsula), Penang Island, Penang Hill (= Bukit Bendera; about 5°25'30"N, 100°16'30"E), 560-650 m; 10.I.1996; leg. P. J. Schwendinger.

DIAGNOSIS: See Schwendinger (1994: 456).

NEW CHARACTERS: In all specimens anterior portion of fovea developed as a more or less distinct deep pit, in several specimens also posterior portion. Ventral side of metarsus I in males and females carrying strongly sigmoid setae on moderately elevated bases; these setae proximally swollen, turning abruptly distad and then tapering away from axis of metarsus at about 30-40° (Fig. 36G). Males additionally with more strongly elevated, conical setal bases (carrying normal setae) prolaterally on metatarsus I and on anterior portion of tibia I. Tiny spine-like microtrichia (not articulate, without a socket; shown as dots in Fig. 15C-T; erroneously called “pit-like depressions” in original description, Schwendinger, 1994: 457) subapically on pro-lateral side of embolus, these decreasing in size distally. Anterior pair of ventrolateral plates in males completely free or their posterior tips fused with margin of pulmonary plate. Vulvae with most or all of ventral wall of genital atrium distinctly pigmented (Fig. 16A-D); this pigmentation not extending onto spermathecae as in species of the *nasuta*-group. Spermathecae with clearly outlined anterior porepatches separated from each other for about their width.

VARIATION: There are two distinct morphological forms of males in this species. In specimens collected in caves (lowland/cave form) the two parts of the bifurcate apex of the embolus are distinctly further apart from each other (Fig. 15K-T) than in males from the mountains (highland form; Fig. 15C-J and Schwendinger, 1994: figs 31-32). The postgenital plate in the lowland/cave form is longer and narrower, with a more strongly convex posterior margin, than in the highland form. This dimorphism is not reflected in females: the vulvae of two females from Penang Hill and of the single female from Gua Tempurung are more strongly convex in lateral view and have the anterior collar situated more posteriorly (Fig. 16B-D) than the vulvae of other females from mountain localities (vulva there only slightly convex and collar more

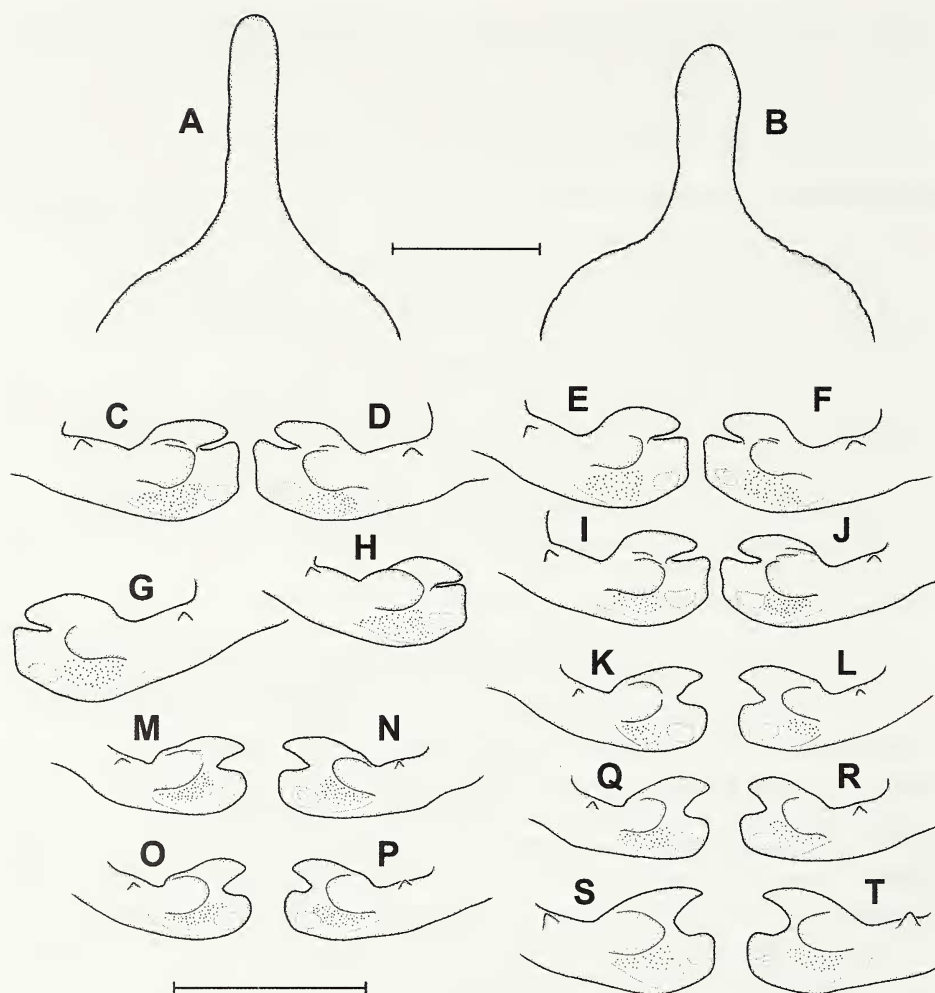


FIG. 15

Perania cerastes, males; highland form (A, C-J), lowland/cave form (B, K-T); holotype from Maxwell Hill (C-D), two paratypes from Maxwell Hill (E-F, G), two specimens from Penang Hill (A, H, I-J), four specimens from Gua Tempurung (B, K-L, M-N, O-P, Q-R), specimen from Gua Kanthan (S-T). (A-B) Clypeal process, dorsal view. (C, E, H, I, K, M, O, Q, S) Left embolus, prolateral view. (D, F, G, J, L, N, P, R, T) Right embolus, same view. Scale line 1.0 mm (A-B; C-T).

anteriorly; Fig. 16A and Schwendinger, 1994: fig. 34). The spermathecal porepatches of the single female collected in a cave are narrower and more angular than in the other females (Fig. 16C cf. Fig. 16A-B), but as only a single female of this form is available, this may only be a case of individual variation. I consider these differences as expressions of geographical variation without species-specific significance.

Carapace lengths in ten males (seven females) range 5.1-7.1 (4.4-4.9), widths 2.7-3.3 (2.9-3.2). No relevant distinctions in somatic morphology could be found

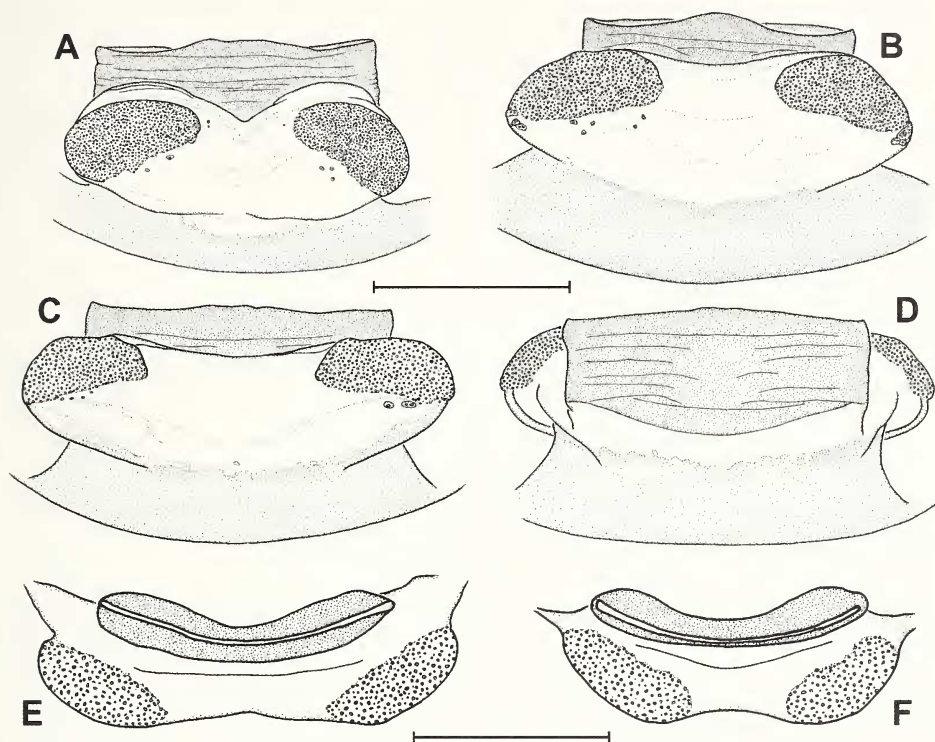


FIG. 16

Perania cerastes, females; from Maxwell Hill (A, F), from Penang Hill (B), from Tempurung Cave (C-E). (A-C) Vulva, ventral view. (D) Same, dorsal view. (E-F) Same, anterior view. Scale lines 0.5 mm (A-D; E-F).

among the specimens from the four localities, except for the males from Tempurung Cave having a relatively shorter clypeal process than males of the highland form (Fig. 15B cf. Fig. 15A); the male from Kanthan Cave has the tip of its clypeal process broken. In the new female from Maxwell's Hill the preanal plate is completely fragmented into microplates; in the two female paratypes (from Maxwell's Hill) it is represented by a small plate; in the three females from Penang Hill and the one from Tempurung Cave the preanal plate is relatively large. In all males the microplates on the posterior side of the opisthosoma are not interconnected and do not form strap-like horizontal plates, but they are closely packed like in a brickwall, except for the uppermost band of one paratype (from Maxwell Hill) in which most posterior microplates are fused. Seven packed horizontal bands are present in one paratype, both males from Penang Hill and two males from Gua Tempurung, five packed bands in two males from Gua Tempurung, one paratype and the holotype, three packed bands in the male from Gua Kanthan.

DISTRIBUTION: This species is currently known from four localities in north-western peninsular Malaysia: Bukit Larut, a mountain on the mainland, north of Ipoh;

Gua Kanthan and Gua Tempurung, two limestone caves in the lowlands, south of Ipoh; Penang Hill, a mountain on Penang Island (Fig. 1, localities 20-23). The type specimens were collected at 1200 m on Bukit Larut.

BIOLOGY: The lowland spiders were found in completely dark parts of two caves, in webs running into holes and cracks at the foot of cave walls. These spiders show no adaptations to cave life. All other spiders of this species were collected from very humid evergreen forests on two mountains.

***Perania coryne* Schwendinger, 1994**

Fig. 17

Perania coryne Schwendinger, 1994: 458-461, figs 35-42 (descriptions of male and female). – Platnick, 2013 (listing).

HOLOTYPE: MHNG; ♂; Malaysia (peninsula), Pahang State, Cameron Highlands (exact locality unknown; about 4°29'N, 101°23'E); 14.-20.IV.1990; leg. Vincent & Barbara Roth.

PARATYPE: 1 ♀ with same data as for holotype. No new material available.

DIAGNOSIS: See Schwendinger (1994: 458).

NEW CHARACTERS: Fovea anteriorly wider and deeper than posteriorly in female, less distinctly so in male. Retrolateral surface of chelicerae medially bulged in both sexes, in female (Fig. 17C) more distinctly so than in male (Fig. 17B). Male and female with proximally swollen, strongly sigmoid setae on slightly elevated bases ventrally on metarsus I; male additionally with more strongly elevated conical bases carrying normal setae prolaterally on entire length of metatarsus I and prolaterally in anterior portion of tibia I. Apex of embolus indistinctly split: small, narrowly lobate subterminal lamella separated by a small indentation from larger, widely rounded embolic part (Fig. 17D-E). Anterior opisthosomal plate of female fragmented into microplates; one pair of them slightly enlarged. Anterior pair of ventrolateral plates of male largely free, only their posterior tips fused with margin of pulmonary plate. Postgenital plate of male completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate of females fragmented. Microplates on posterior side of opisthosoma of male not interconnected. Vulva with ventral wall of genital atrium pigmented only laterally, leaving a wide, transparent median zone (mentioned but not illustrated in the original description; Schwendinger, 1994: 461, fig. 41). Spermathecae with clearly outlined anterior porepatches on flat surface, separated from each other for much less than their widths; posterior portion of spermathecae not pigmented (Fig. 17F-G).

DISTRIBUTION: Known only from the type locality in the mountains of central peninsular Malaysia (Fig. 1, locality 24).

THE *PERANIA UTARA* SPECIES GROUP

DIAGNOSIS: Medium-sized species without modifications on clypeus, on “thoracic” portion of carapace or on chelicerae. Female with vulva characterized by large external pouches opening into ventral side of spermathecae; spermathecae and ventral wall of genital atrium entirely and uniformly pigmented; porepatches indistinctly outlined and only slightly extending onto dorsal side of spermathecae; common anterior margin of spermathecae widely arched, not invaginated; strap-like horizontal

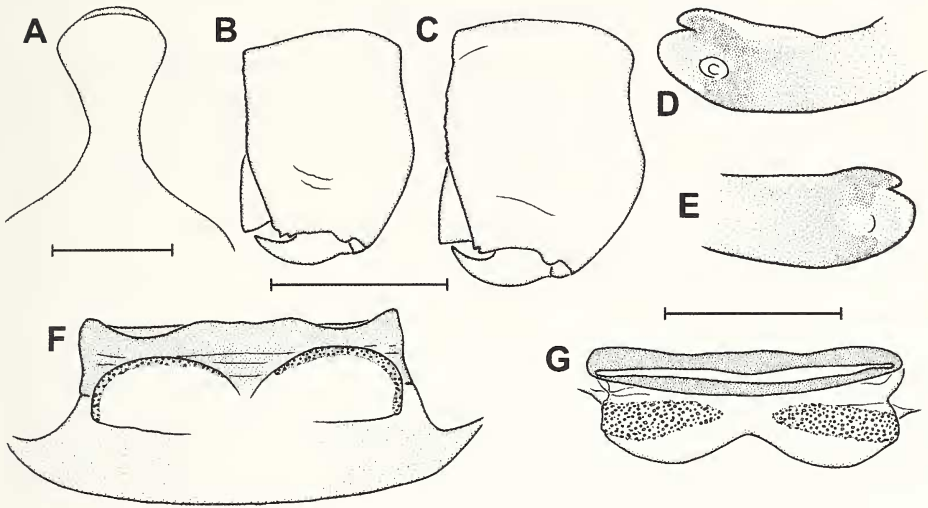


FIG. 17

Perania coryne, male holotype (A-B, D-E) and female "allotype" (C, F-G). (A) Clypeal process, dorsal view. (B-C) Left chelicera, anterior view. (D) Apex of right embolus, prolateral view. (E) Apex of left embolus, same view. (F) Vulva, ventral view. (G) Same, anterior view. Scale lines 1.0 mm (A; B-C), 0.5 mm (D-G).

plates on posterior side of opisthosoma. Male with metatarsus II carrying conical setal bases; femora of legs granular, femur of palp smooth; bulb of palpal organ ovoid, embolus short and straight.

SPECIES INCLUDED: Only *Perania utara* sp. n.

DISTRIBUTION: Northern Sumatra Province (Fig. 1, locality 25). Further species of this group can be expected to occur in the northern part of Sumatra.

***Perania utara* sp. n.**

Figs 18, 36C, 37C

HOLOTYPE: MHNG, sample Sum-06/28; ♂; Indonesia, Sumatra, North Sumatra Province (= Sumatera Utara), hill about 1 km NE of Sibolga (1°45'22"N, 98°46'48"E), 300 m; 26.VI.2006; leg. P. J. Schwendinger.

PARATYPE: 1 ♀ "allotype" with same data as for holotype.

ETYMOLOGY: Indonesian: "utara" = north, northern. Noun in apposition.

DIAGNOSIS: Similar to *P. nigra*, both sexes distinguished by posteriorly narrower carapace without modifications in "thoracic" portion. Females distinguished by spermathecae carrying distinct external pouches (not just chambers inside the spermathecae) on ventral surface, these long and distinctly separated from each other; anterior margin of spermathecae not invaginated; dorsal collar of vulva much wider than in *P. nigra*; anterior opisthosomal plate and preanal plate of female completely fragmented; posterior side of opisthosoma with eight horizontal, strap-like plates of variable width. Male with tibia I and metatarsus I carrying many more conical setal

bases than males of *P. nigra*, a few conical setal bases also on metatarsus II; palpal organ much shorter and stouter, with a deeper apex.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) generally brown, carapace, chelicerae and ventral sclerites dark brown; membranous parts of opisthosoma light grey-brown. "Thoracic" portion of carapace unusually narrow in dorsal view. Clypeus without median process (Fig. 18A). Fovea deepened and slightly widened in anterior portion. Total length 6.7. Carapace 3.5 long, 2.1 wide. Eye sizes and interdistances: PME 0.21 long, separated by 0.24; ALE 0.22 long; ALE-PLE 0.06; PLE 0.22 long, separated by 1.07. Labium 0.6 long, 0.8 wide. Sternum 2.2 long, 1.5 wide. Chelicerae without modifications; with two teeth on anterior margin of fang furrow.

Palp 2.6 long (0.8+0.4+0.7+0.7), femur smooth (setal bases not visibly elevated). Cymbium (Fig. 18C) of typical shape, with a pointed apex. Palpal organ quite short and stout; embolus with relatively deep base and indistinctly bifid apex with a pointed dorsad-directed subterminal lamella and a lobate distad-directed embolic part; distal margin of apex slightly invaginated and carrying three teeth (Fig. 18B-D).

Legs 34=21. Femora granular (with slightly elevated setal bases). About 50 quite large conical setal bases prolaterally to ventrally on metatarsus I, about 10 large ones prolaterally and about 50 smaller ones proventrally and ventrally on tibia I; four smaller ones proventrally and prolaterally on metatarsus II, none on tibia II. Paired leg claws with a row of 9-12 teeth; unpaired leg claws with one denticle. Leg I 12.5 long (3.8+1.2+3.9+2.5+1.1), leg II 10.0 long (3.0+1.0+2.8+2.2+1.0), leg III 7.6 long (2.3+0.8+1.8+1.8+0.9), leg IV 10.0 long (2.9+0.9+2.7+2.6+0.9).

Opisthosoma 3.5 long, 2.4 wide. Dorsal scutum 3.2 long, 2.3 wide, somewhat oval, its surface smooth. Most microplates on posterior side of opisthosoma isolated but closely packed, some fused (especially in first, third, fourth, fifth and sixth row from above; Fig. 37C). Pulmonary plate 2.3 long, 2.0 wide. Anterior pair of ventro-lateral plates largely free, only their posterior tips fused with margin of pulmonary plate. Postgenital plate completely fused to posterior margin of pulmonary plate, with a sclerotised suture linking them. Preanal plate 0.2 long, 0.7 wide, somewhat elliptical (Fig. 36C). Anal plate 0.7 long, 1.0 wide.

DESCRIPTION OF FEMALE ("allotype"; dissected): As in male, except for the following. Total length 7.2. Carapace 3.6 long, 2.2 wide. PME 0.22 long, 0.35 apart; ALE 0.21 long; ALE-PLE 0.07; PLE 0.21 long, 1.21 apart. Labium 0.6 long, 0.9 wide. Sternum 2.2 long, 1.6 wide. Palp 2.7 long (0.8+0.4+0.6+0.9). Legs 3241; tibiae and metatarsi I-II without conical setal bases. Paired leg claws with a row of 11-14 teeth. Leg I 11.2 long (3.3+1.1+3.3+2.4+1.1), leg II 9.5 long (2.8+1.0+2.6+2.1+1.0), leg III 7.6 long (2.2+0.9+1.8+1.8+0.9), leg IV 9.9 long (2.9+0.9+2.6+2.5+1.0).

Opisthosoma 4.4 long, 3.4 wide. Anterior plate fragmented into microplates, two of them slightly larger than the rest. Dorsal scutum 3.0 long, 1.9 wide, its surface with a few scattered low tubercles and low ridges. All microplates flat; median microplates in bands on posterior side of opisthosoma fused, forming eight strap-like horizontal plates, the uppermost one fused to posterior margin of dorsal scutum. Pulmonary plate 2.0 long, 2.1 wide, its posterior margin almost straight. Preanal plate fragmented into a group of slightly enlarged microplates. Anal plate 0.8 long, 1.0 wide.

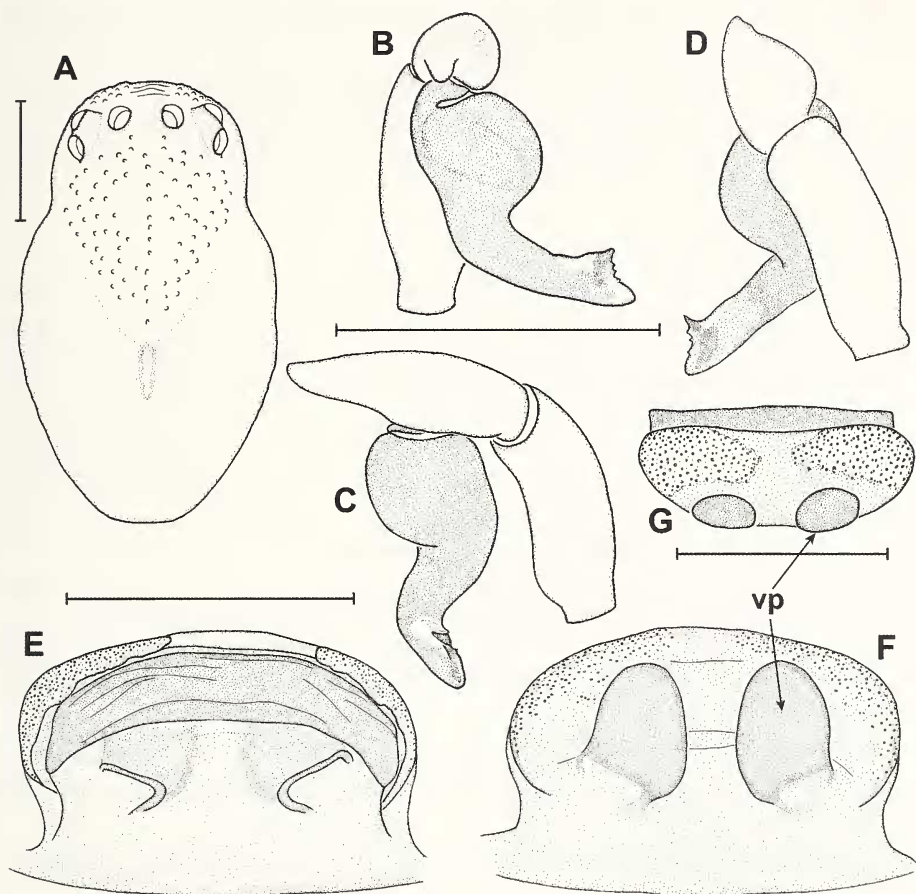


FIG. 18

Perania utara sp. n.; male holotype (A-D) and female "allotype" (E-G). (A) Carapace, dorsal view. (B) Left palp, ventral view. (C) Same, dorsal view. (D) Same, retrolateral view. (E) Vulva, dorsal view. (F) Same, ventral view. (G) Same anterior view. Abbreviation: vp = external ventral pockets. Scale lines 1.0 mm (A; B-D), 0.5 mm (E-F; G).

Vulva with short, very wide anterior collar; ventral wall of genital atrium and spermathecae pigmented throughout; spermathecae completely fused in the middle, elliptical, common anterior margin widely arched, not invaginated and without anterolateral trenches, with indistinctly outlined porepatches; a pair of paddle-shaped external pouches (filled with sperm and therefore clearly serving as receptacles) attached to posterior portion of ventral side of spermathecae (Fig. 18E-G).

RELATIONSHIPS: The relatively short and stout palpal organ resembles that of *P. egregia* sp. n. but that is probably a homoplasy. The ovoid bulbus of the palpal organ and the paired modifications in the ventral wall of the vulva indicate that *P. utara* sp. n. could be sister to the other *Perania* known from Sumatra. However, these similarities may be plesiomorphies (see Discussion).

DISTRIBUTION: Known only from the type locality, a small hill at the northern outskirts of Sibolga city (Fig. 1, locality 25).

BIOLOGY: The specimens examined were collected by sifting leaf litter in a remnant patch of rain forest near the top of a small hill. No webs were seen, but it is likely that *P. utara* sp. n. constructs irregular sheetwebs as typical for spiders of this genus.

THE *PERANIA NIGRA* SPECIES GROUP

DIAGNOSIS: Small to large species characterized by “thoracic” portion of carapace in both sexes either unmodified, or with a pair of long and spine-like or low and hump-like processes; fovea anteriorly with a more or less distinctly widened pit. Females with spermathecae containing sclerotised internal chambers in the ventral wall; porepatches distinctly outlined and extending far onto dorsal side of spermathecae; ventral side of spermathecae between porepatches and internal chambers unpigmented; ventral wall of genital atrium entirely or only medially pigmented; common anterior margin of spermathecae more or less distinctly invaginated in the middle; anterior opisthosomal plate entire or fragmented into microplates of various sizes; preanal plate rudimentary or completely fragmented into microplates. Males with bulbus of palpal organ ovoid; embolus long and distinctly sigmoid; clypeus unmodified, or with a short tooth-like clypeal process, or with a long digitiform clypeal process (but never with a widened apex); chelicerae unmodified; femora of legs and palps smooth.

SPECIES INCLUDED: *Perania armata*, *P. deelemanae* sp. n., *P. harau* sp. n., *P. korinchica*, *P. nigra*, *P. picea*, *P. selatan* sp. n. and an undescribed species from Brastagi.

DISTRIBUTION: Only known from the Indonesian island of Sumatra (Fig. 1, localities 26-36).

Perania harau sp. n.

Figs 19-20

HOLOTYPE: MHNG, sample Sum-06/17; ♂; Indonesia, Sumatra, West Sumatra Province, N of Payakumbuh, entrance of unnamed cave above Harau Canyon (0°06'25"S, 100°40'37"E), 700 m; 9.VI.2006; leg. P. J. Schwendinger.

PARATYPES: MHNG; 3 ♂ and 4 ♀ collected together with the holotype. – MHNG, sample Sum-06/15; 1 ♂ (mature 14.XI.2006); forest above Harau Canyon, near unnamed cave (type locality), 700 m; 9.VI.2006; leg. P. J. Schwendinger.

ETYMOLOGY: The specific epithet refers to the type locality. Name in apposition.

DIAGNOSIS: Similar to *P. picea*, distinguished by smaller size and wider anterior pit in fovea. Males distinguished by distinctly longer clypeal process; transition between bulbus and embolus rather V-shaped, with inner margins (facing each other) not parallel (U-shaped, with parallel inner margins in *P. picea*); distal portion of embolus with a distinct subapical ventral lamella and a very indistinct subterminal lamella. Females with smaller, more thick-walled internal chambers in the ventral side of their spermathecae.

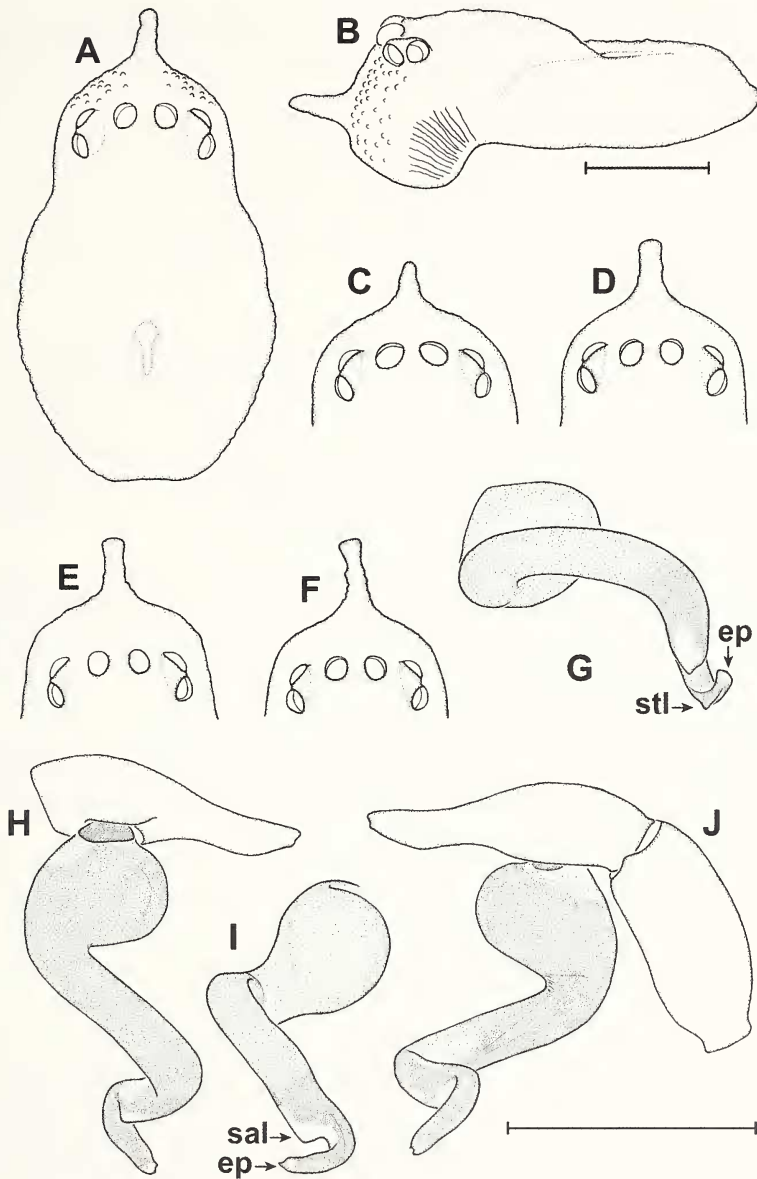


FIG. 19

Perania harau sp. n.; male holotype (A-B, G-J) and four male paratypes (C-F). (A) Carapace, dorsal view. (B) Same, lateral view. (C-F) Anterior portion of carapace, dorsal view. (G) Left palpal organ, ventral view. (H) Left cymbium and palpal organ, prolateral view. (I) Left palpal organ, distal view. (J) Distal portion of left palp, retrolateral view. Abbreviation: ep = embolic part of bifid apex of palpal organ), sal = subapical lamella, stl = subterminal lamella. Scale line 1.0 mm (A-F; G-J).

DESCRIPTION OF MALE (holotype): Colour (in alcohol) dark brown on carapace, chelicerae, palps, anterior legs and ventral sclerites, slightly lighter on posterior legs, opisthosomal sclerites and palpal organ; membranous parts of opisthosoma light grey-brown. Clypeus with moderately long, digitiform median process occupying 13% of carapace length (Fig. 19A-B). Fovea distinct, its anterior portion a relatively wide round pit, its posterior portion a shallow longitudinal furrow. Total length 7.8. Carapace 4.0 long, 2.3 wide. Eye sizes and interdistances: PME 0.25 long, separated by 0.13; ALE 0.24 long; ALE-PLE 0.06; PLE 0.24 long, separated by 0.95. Labium 0.7 long, 0.9 wide. Sternum 2.3 long, 1.7 wide. Chelicerae without modifications; with two teeth on anterior fang furrow.

Palp 3.5 long (1.1+0.4+0.9+1.1). Cymbium (Fig. 19H, J) relatively long, with narrow apex. Palpal organ with somewhat V-shaped transition from bulbus to embolus, inner sides of both parts (facing each other) not parallel but at an acute angle (Fig. 19H, J); embolus long, fairly straight in proximal portion, sigmoid in distal portion; a distinct, white, triangular subapical lamella ventrally below shallow, hook-shaped apex; subterminal lamella of apex very indistinct (visible as a small crest in Fig. 19G) and distad-directed; embolic part of apex long, shallow, tapering and ventrad-directed (Fig. 19H-J).

Legs 3241. Eight quite large conical setal bases distributed over almost entire length of metatarsus I proventrally and ventrally, three over distal third of tibia I pro-laterally. Paired leg claws with a row of 10-15 teeth; unpaired leg claws with one denticle. Leg I 15.9 long (4.8+1.5+5.2+3.1+1.3), leg II 12.8 long (3.9+1.2+3.8+2.7+1.2), leg III 10.0 long (3.1+1.0+2.5+2.4+1.0), leg IV 13.0 long (4.0+1.1+3.5+3.3+1.1).

Opisthosoma 3.9 long, 2.6 wide. Dorsal scutum 3.5 long, 2.4 wide, somewhat oval, posteriorly wider than anteriorly, its surface smooth. A few microplates on anterior side of opisthosoma (above anterior margin of pulmonary plate) elevated and obliquely pointed; all other microscerites flat and separated from each other. Pulmonary plate 2.6 long, 2.1 wide; genital region flat. Anterior pair of ventrolateral plates largely free, only their posterior tips fused with margin of pulmonary plate. Postgenital plate only laterally fused with pulmonary plate, medially separated by a distinct, angular membranous stripe. Preanal plate 0.2 long, 0.7 wide, with right margin rounded and left margin straight. Anal plate 0.8 long, 1.1 wide.

DESCRIPTION OF FEMALE ("allotype"; not dissected): As in male, except for the following. Colour in alcohol generally lighter (more strongly bleached), difference between anterior and posterior legs less pronounced. Total length 8.0. Carapace 3.8 long, 2.5 wide, "cephalic" portion more strongly elevated than in male, without modification of clypeus. PME 0.25 long, 0.20 apart; ALE 0.25 long; ALE-PLE 0.07; PLE 0.24 long, 1.15 apart. Labium 0.7 long, 1.0 wide. Sternum 2.5 long, 1.8 wide. Palp 3.7 long (1.1+0.5+0.8+1.3). Legs 3241; tibiae and metatarsi I-II without conical setal bases. Paired leg claws with a row of 9-15 teeth. Leg I 15.1 long (4.7+1.5+4.6+3.0+1.3), leg II 12.5 long (3.8+1.3+3.5+2.7+1.2), leg III 9.6 long (3.0+1.0+2.4+2.3+0.9), leg IV 12.6 long (3.9+1.1+3.3+3.1+1.2).

Opisthosoma 4.5 long, 3.2 wide. Anterior plate fragmented into microplates, two of them slightly larger than the rest. Elevated and obliquely pointed microplates on anterior side of opisthosoma smaller than in male. Dorsal scutum 3.5 long, 2.7 wide,

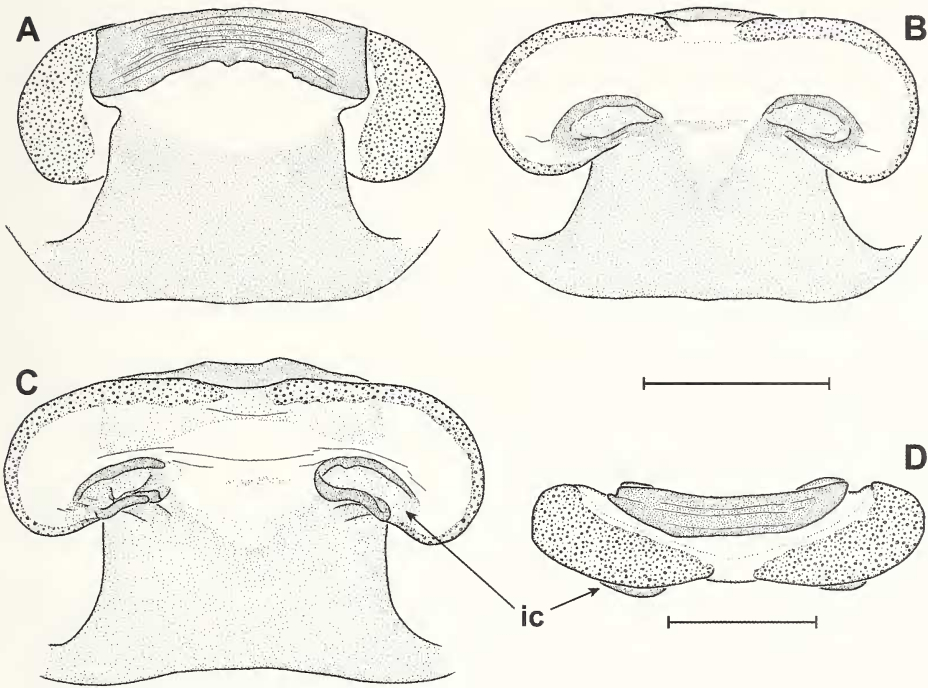


FIG. 20

Perania harau sp. n.; two female paratypes (A-B; C-D). (A) Vulva, dorsal view. (B, C) Same, ventral view. (D) Same, anterior view. Abbreviation: ic = internal chamber of spermatheca. Scale lines 0.5 mm (A-C; D).

its surface with a few indistinct ridges. Pulmonary plate 2.5 long, 2.3 wide; genital region bulged, flanked by several curved wrinkles; posterior margin slightly and very widely invaginated. Preanal plate fragmented into microplates, a few of them slightly larger than others. Anal plate 0.9 long, 1.1 wide.

Vulva (of paratypes, Fig. 20) with quite long, entirely pigmented ventral wall of genital atrium; anterior collar short, its widely rounded anterior margin only little surpassing anterior margin of spermathecae; spermathecae very wide, their common anterior margin almost straight, not or only indistinctly invaginated, their lateral sides bulged, without trenches; porepatches extending far onto dorsal side of spermathecae; a fairly small pair of elliptical internal chambers with thick, closed or laterally open walls in ventral wall of spermathecae.

VARIATION: Carapace length in five males (four females) ranges 4.0-4.2 (3.5-4.0), carapace width 2.3-2.4 (2.3-2.6). See Fig. 19A-F for variation in the shape of the clypeal processes of five males, Fig. 20 for variation in the vulvae of two females. In the holotype and one male paratype the anterior pair of ventrolateral opisthosomal plates lie so close to the lateral margin of the pulmonary plate that they look fused; in other males the separation is more visible. In three male paratypes the postgenital plate is reduced to a small isolated sclerite of variable shape behind the gonopore; in the

fourth paratype and in the holotype it is a short wide sclerite medially separated from the posterior margin of the pulmonary plate and laterally fused to it (as shown in Fig. 27E-F for *P. picea*). In all females examined the peanal plate is completely fragmented into microplates.

RELATIONSHIPS: The new species is most closely related to *P. picea*. Both have a very similar embolus with a small, triangular, distad-directed subterminal lamella and a long, shallow, tapering, sharply ventrad-bent embolic part, and a very long genital atrium. These are probably synapomorphies.

DISTRIBUTION: Known only from the type locality on Sumatra (Fig. 1, locality 26).

BIOLOGY: Most spiders examined were collected from typical webs between rocks and boulders and on the walls at the entrance (in the twilight zone) of an unnamed granite cave surrounded by rain forest. These spiders show no recognizable adaptations to cave-life. One spider was found outside the cave.

***Perania nigra* (Thorell, 1890)**

Figs 21-23

Phaedima nigra Thorell, 1890: 310 (description of male and female).

Paculla nigra (Thorell, 1890). – Simon, 1894: 573 (transfer).

Perania nigra (Thorell, 1890). – Bourne, 1980: 256, figs 12-19 (designation of lectotype; redescription of types; transfer). – Lehtinen, 1981: 15-16, figs 6, 8-9 (designation of lectotype; redescription of types; transfer). – Platnick, 2013 (listing).

Perania pallida Thorell, 1890: 316 (description of juvenile), synonymised by Lehtinen, 1981: 15.

TYPES: MCSNG; ♂ lectotype and 1 ♀ paralectotype; Indonesia, Sumatra, West Sumatra Province, Singalang (= Gunung Singgalang; about 0°23'S, 100°21'E) near Bukittinggi; VIII.1878; leg. Odoardo Beccari.

NEW MATERIAL EXAMINED: MHNG, sample Sum-00/08; 1 ♂, 2 ♀, 2 juveniles; Indonesia, Sumatra, West Sumatra Province, near Lake Maninjau, waterfall above Gasang Village (about 0°16'30"S, 100°13'50"E), 600-700 m; 12.II.2000; leg. P. J. Schwendinger.

DIAGNOSIS: Distinguished by a pair of low humps on "thoracic" portion of carapace in both sexes; males with relatively deep, paddle-shaped apex of embolus with a tiny, tooth-like, distad-directed embolic part; females with large anterior opisthosomal plate fused with pulmonary plate, and with internal chambers of spermathecae medially connected by a sclerotised bridge.

RE-DESCRIPTION: Small species; both sexes without clypeal process; a pair of low humps sitting on "thoracic" portion of carapace (Fig. 21A-D); cowpat-shaped tubercles on carapace low, indistinct; conical tubercles along lateral margins of carapace relatively large; anterior portion of fovea pitlike and wider than posterior portion. Males without cheliceral modifications; few conical setal bases prolaterally in distal half of tibia I, many prolaterally to ventrally over entire length of metatarsus I; anterior pair of ventrolateral plates largely free, only their posterior tips fused with margin of pulmonary plate; postgenital plate more or less completely fused to pulmonary plate; all microplates on posterior side of opisthosoma isolated; cymbium relatively short, with pointed apex (Fig. 22A, D); bulbus ovoid, with U-shaped transition to long and sigmoid embolus (Fig. 22A); apex of embolus deep and somewhat paddle-shaped, with a widely angular or lobate subterminal lamella and with a tiny, tooth-like, distad-

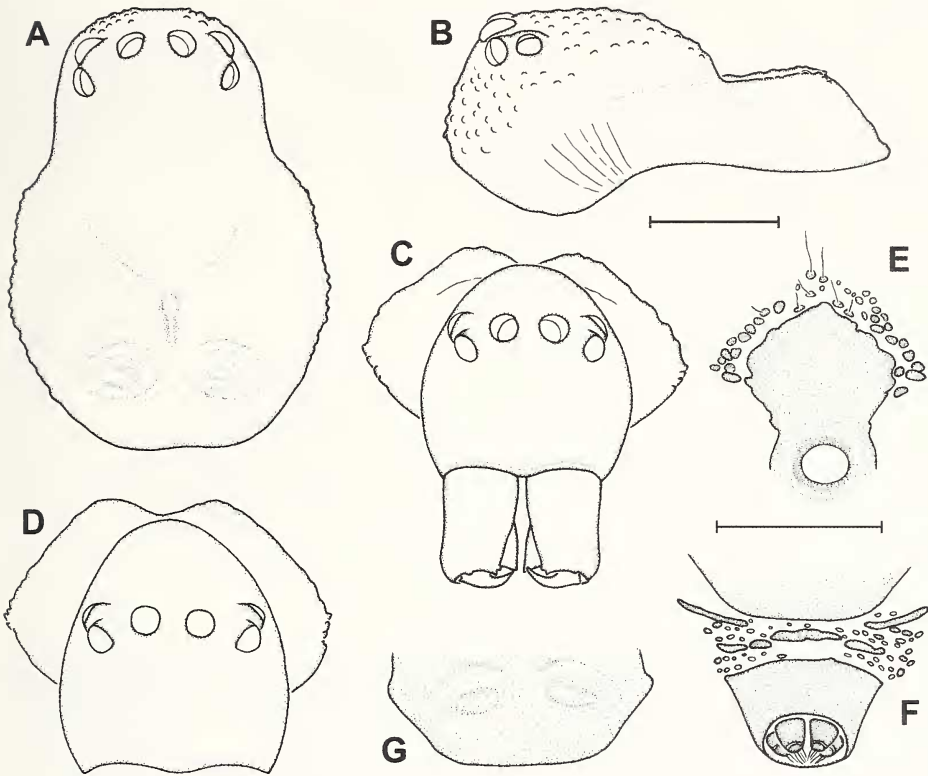


FIG. 21

Perania nigra, male lectotype (A-C), female paralectotype (D-G). (A) Carapace, dorsal view. (B) Same, lateral view. (C) Carapace and chelicerae, anterior view. (D) Carapace, anterior view. (E) Upper anterior side of opisthosoma showing entire anterior plate fused with pulmonary plate. (F) Posterior portion of opisthosoma showing reduced preanal plate, ventral view. (G) Genital region showing outlines of vulva, ventral view. Scale lines 1.0 mm (A-B; C-G).

directed embolic part (Fig. 22B-F). Females with a rudimentary preanal plate (Fig. 21F) and with a large, clearly outlined anterior opisthosomal plate being widely fused with pulmonary plate (Fig. 21E); some opisthosomal microplates near dorsal scutum conical but only slightly elevated; vulva with a short and relatively narrow anterior collar (Fig. 23A, D); fused spermathecae with a deep V-shaped invagination in common anterior margin, ventral wall including a pair of short and wide internal chambers with thin or broken retrolateral walls and thick prolateral walls, both chambers connected to each other by a sclerotised median bridge; ventral wall of spermathecae between porepatches and internal chambers unpigmented (Fig. 23B, E); anterolateral sides of spermathecae with shallow trenches (Fig. 23C, F); porepatches large, extending far onto dorsal side of spermathecae (Fig. 23A, D); ventral wall of genital atrium with wide, slightly pigmented median zone flanked by transparent lateral zones (Fig. 23A-B, D-E).

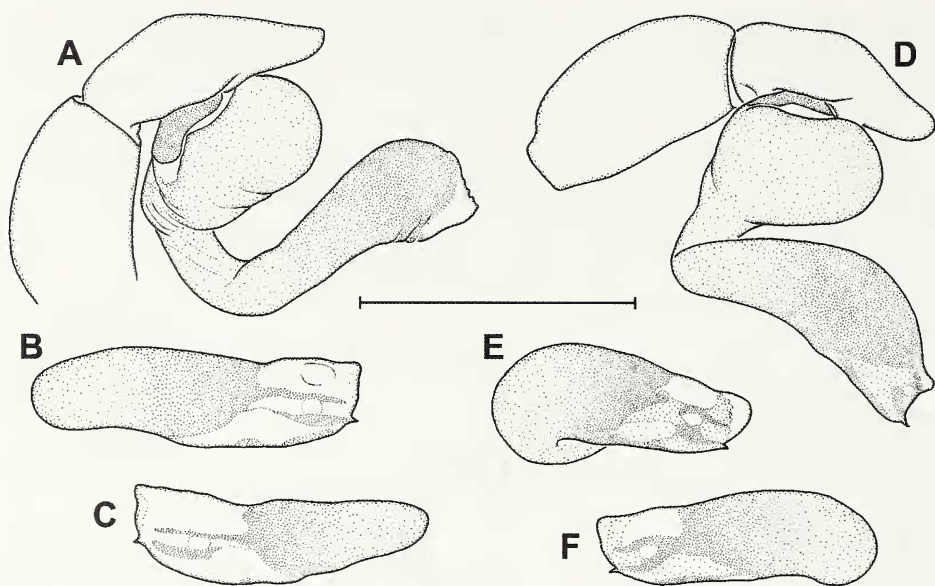


FIG. 22

Perania nigra, male lectotype (A-C), new male (D-F). (A) Distal portion of left palp, prolateral view. (B, E) Apex of left embolus, proventral view. (C, F) Apex of right embolus, same view. (D) Distal part of left palp, proventral view. Scale line 1.0 mm.

VARIATION AND MEASUREMENTS: Carapace lengths in two males (three females) are 3.3 (3.2-3.5), carapace widths 2.3-2.5 (1.9-2.5); the types have the highest values. The male lectotype has a widely invaginated posterior margin of the dorsal opisthosomal scutum, the new male has a straight margin. In the male lectotype the postgenital plate is completely fused to the pulmonary plate, in the new male both plates are medially separated by a very thin membranous stripe. The lectotype has slightly larger tubercles along the lateral margins of the carapace, and more numerous conical setal bases in the distal half of tibia I, whereas the new male has fewer conical tubercles restricted to the distal quarter of tibia I. In the two new females the preanal plate is smaller (but also distinct) than in the female paralectotype.

REMARKS: The female paralectotype was not dissected, but the outlines of the spermathecae and of the ventral chambers are visible from under the cuticle of the pulmonary plate (Fig. 21G) and correspond to those of the vulvae of the newly collected females.

Bourne (1980: 256, fig. 19) called the small unpaired ventral plate of the female paralectotype a "postgenital plate". This confusion probably results from the fact that this specimen has a slightly shrunk opisthosoma in which the median ventrolateral plates (lying between the postgenital and preanal plates) are not clearly visible. A comparison with newly collected females with firm opisthosomata clearly shows a small unpaired ventral plate (with a smooth surface) lying between a triangular pair of median ventrolateral plates and an oval pair of posterior ventrolateral plates (with

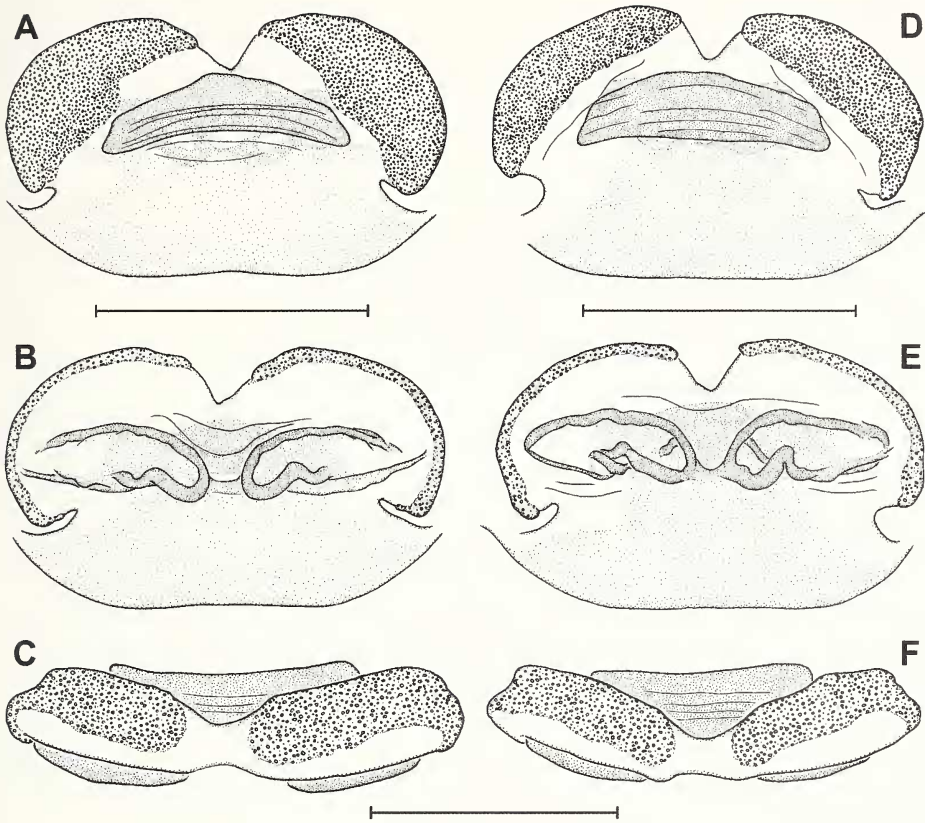


FIG. 23

Perania nigra, two females (A-C; D-F). (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C, F) Same, anterior view. Scale lines 0.5 mm (A-E; C-F).

granular surfaces). Therefore the median plate illustrated by Bourne is the moderately reduced preanal plate and not the postgenital plate. The postgenital plate is completely fragmented in all *Perania* females. Bourne (1980: 256, fig. 14) claimed that there are "no defined plates between pulmonary and anal plates" in the male lectotype of this species and did not illustrate a preanal plate in the corresponding figure although that is well-developed and clearly visible (as in all *Perania* males).

RELATIONSHIPS: The pair of humps posteriorly on the "thoracic" portion of the carapace and strong similarities in copulatory organs of males and females of *P. armata* show that *P. nigra* and *P. armata* are the closest relatives. Moreover both species share a complete anterior opisthosomal plate, which is more or less fragmented in other congeners. However, the presence of an entire anterior plate is probably plesiomorphic, as may be the presence of paired structures in and on the spermathecae of all *Perania* species from Sumatra.

DISTRIBUTION AND HABITAT: *Perania nigra* is known from two localities (about 15 km apart) in West Sumatra Province (Fig. 1, localities 28-29). The types of *P. nigra*

and the original types of *P. armata* (now lost) were allegedly all collected on Mt Singgalang (Fig. 1, locality 29). Thus both species may occur side by side, although that seems unlikely given their close relationship. The new specimens were collected from a fallen, partially rotten tree and from holes in a stream bank in a remnant patch of primary rain forest.

***Perania armata* (Thorell, 1890)**

Figs 24-26

Phaedima armata Thorell, 1890: 313 (description based on two female syntypes, these later lost). – Bourne, 1980: 250, 259 (mention as a “lost species” that belongs in *Perania*).

Paculla armata (Thorell, 1890). – Simon, 1894: 573 (transfer).

Mirania armata (Thorell, 1890). – Lehtinen, 1981: 17, figs 3-5, 12 [description of male; designation of male neotype (in MZT, not examined); transfer].

Perania armata (Thorell, 1890). – Schwendinger, 1989: 579 (transfer by synonymisation of *Mirania* with *Perania*).

TYPES: MCSNG; 2 ♀ syntypes (lost during flooding in 1970); Indonesia, Sumatra, West Sumatra Province, Singalang (= Gunung Singgalang, near Bukittinggi; about 0°23'S, 100°21'E) and Lubu Selassi (= Lubuk Selasih, on road from Padang to Solok, at the foot of Gunung Talang; about 0°57'50"S, 100°36'30"E); 1878; leg. O. Beccari. – Zoological Museum, University of Turku, Finland; ♂ neotype (not examined); West Sumatra Province, 4 km SW of Padangpanjang, Lembah Anai (about 0°28'30"S, 100°21'10"E) at the foot of Gunung Singgalang; 26.IX.1978; leg. P. T. Lehtinen.

NEW MATERIAL EXAMINED: MHNG, sample Sum-06/01; 1 ♂, 2 ♀, 4 juveniles (= 1 penultimate ♂, 1 penultimate ♀, 1 earlier instar, 1 very small juvenile); Indonesia, Sumatra, West Sumatra Province, forest above Taman Hutan Raya Bung Hatta, near road from Padang to Lubuk Selasih (0°56'45"S, 100°32'37"E), 1100 m; 29./30.V.2006; leg. P. J. Schwendinger.

DIAGNOSIS: Juveniles and adults of both sexes easily recognizable by a pair of distinct horns on “thoracic” portion of carapace; adults distinguished by details of their copulatory organs, females additionally by large opisthosomal plate separated from pulmonary plate.

RE-DESCRIPTION: The smallest nominal species in the genus (body 4.3-5.2 long), characterised by a pair of long, straight, dorsad-directed horns on “thoracic” portion of carapace in males, females and at least two juvenile instars (Fig. 24A-F). Cowpat-shaped tubercles in this region very low and indistinct. Clypeus without modification. Anterior margin of cheliceral furrow with two teeth. Few conical setal bases on tibia I and metatarsus I. Large, clearly outlined, somewhat pentagonal anterior opisthosomal plate separated from pulmonary plate in females (Fig. 24H-I). All microplates on posterior side of opisthosoma of new male isolated; all microplates on opisthosoma of females flat. Anterior pair of ventrolateral plates of males fused with pulmonary plate posteriorly and in median portion, leaving a narrow membranous stripe below the spiracles (see Lehtinen, 1981: fig. 4). Postgenital plate of male distinct or indistinct, more or less widely linked to pulmonary plate by a sclerotised suture. Preanal plate completely fragmented in females. Cymbium with moderately long, pointed apex (Fig. 25A, C; Lehtinen, 1981: fig. 5a). Palpal organ with ovoid bulbus and sigmoid embolus, the transition between the two U-shaped (Fig. 25A; Lehtinen, 1981: fig. 5a); embolus becoming gradually deeper in median portion, its apex shallower, indistinctly divided into a short, narrowly lobate subterminal lamella and a rounded embolic part without a tooth (Fig. 25B, D; Lehtinen, 1981: fig. 5b). Vulva wide, its anterior collar short and relatively narrow, not or only slightly surpassing

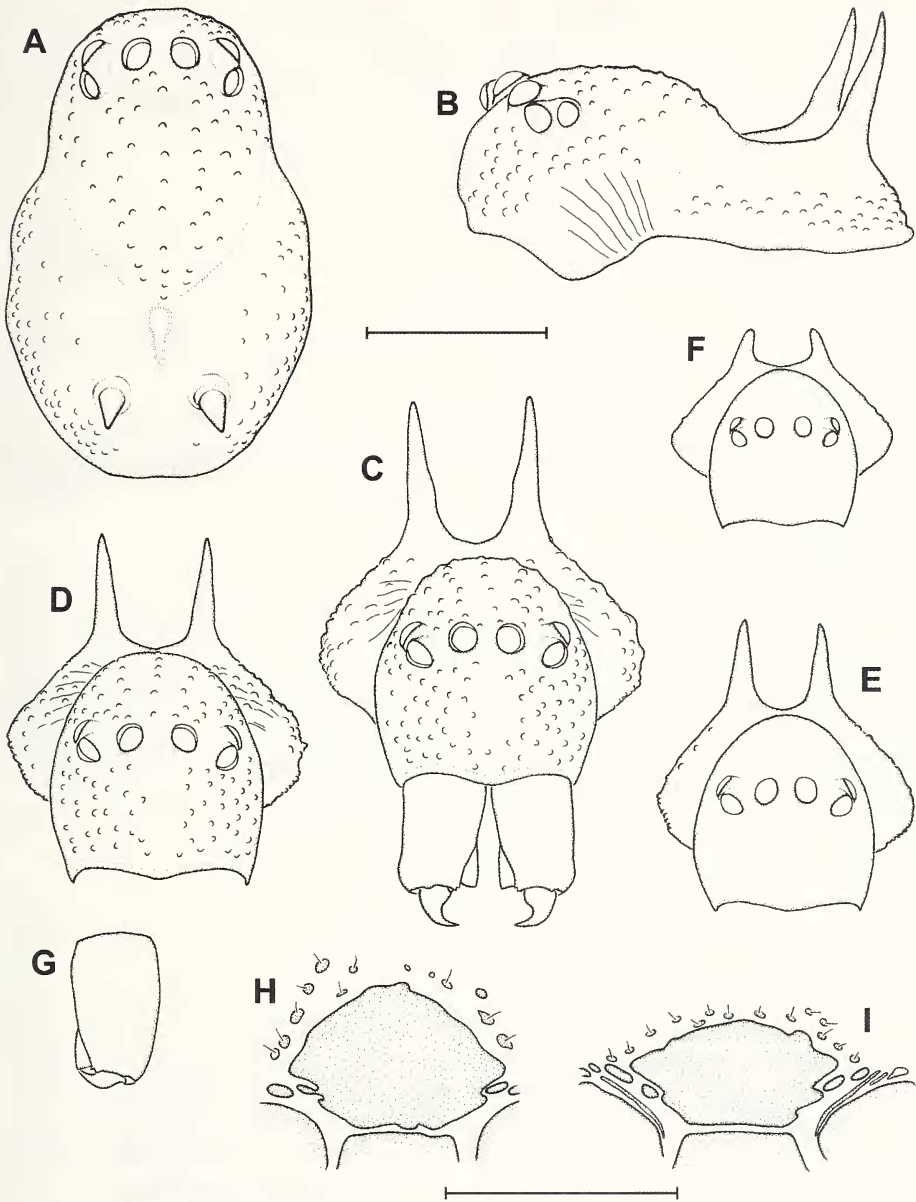


FIG. 24

Perania armata; male (A-C), two females (D, G-I), two juveniles (E-F). (A) Carapace, dorsal view. (B) Same, lateral view. (C) Carapace and chelicerae, anterior view. (D-F) Carapace, anterior view. (G) Left chelicera, anterior view. (H-I) Entire anterior opisthosomal plate separated from pulmonary plate, anterior view. Scale lines 1.0 mm (A-G; H-I).

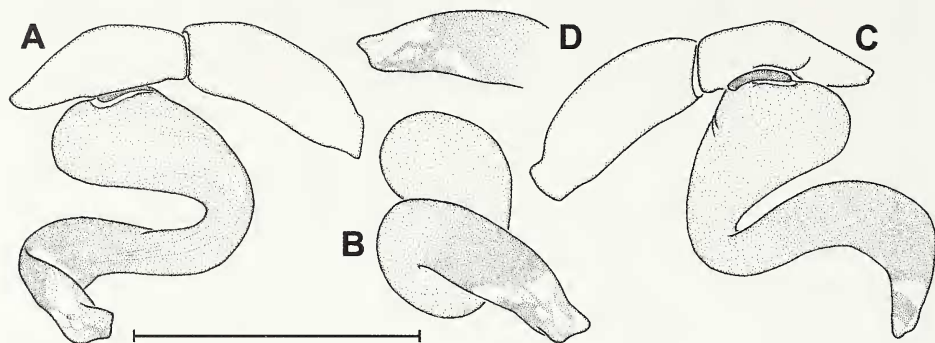


FIG. 25

Perania armata; male palp. (A) Distal portion of left palp, retrodorsal view. (B) Palpal organ, distal view. (C) Distal portion of left palp, proventral view. (D) Apex of right embolus, distal view. Scale line 1.0 mm.

common anterior margin of spermathecae (Fig. 26A, D); spermathecae with a more or less pronounced invagination in common anterior margin, lateral sides plane, without trenches (Fig. 26C, F), porepatches extending quite far onto dorsal side of spermathecae (Fig. 26A, D), ventral wall of spermathecae with a pair of wide, thick-walled internal chambers, these not connected by a median bridge (Fig. 26B, E); genital atrium quite short, with median zone of ventral wall weakly pigmented and less distinctly outlined than in *P. nigra*, lateral zones unpigmented (Fig. 26A-B, D-E).

VARIATION AND MEASUREMENTS: Carapace lengths in two males, including the neotype (and in two females) are 2.25-2.57 (2.49-2.51), carapace width 1.52-1.72 (1.66). The vulvae of two females are shown in Fig. 26. The neotype appears to have the spiracular plate incompletely fused with the pulmonary plate (Lehtinen, 1981: figs 4, 12), which is not the case in the new male or in any other *Perania* male examined. The new male has a somewhat elliptical postgenital plate (about half as wide as the preanal plate) which is anteriorly widely connected to the posterior margin of the pulmonary plate, with a sclerotised suture linking both plates; in the neotype the postgenital plate appears to be more strongly reduced and completely fused with the pulmonary plate, possessing an almost straight posterior margin (Lehtinen, 1981: 17, fig. 12). The preanal plate in the neotype (Lehtinen, 1981: fig. 12) appears to be reduced in size, whereas in the new male it is distinctly larger and quite normal for *Perania* males. The new male carries two conical setal bases prolaterally in the distal quarter of its tibia I, and 5-6 such tubercles prolaterally and proventrally in the distal three-quarters of its metatarsus I; the male neotype has seven conical setal bases on metatarsus I, but none are mentioned for its tibia I (Lehtinen, 1981: 17).

RELATIONSHIPS: Paired modifications in the "thoracic" portion of the carapace in both sexes and strong similarities in male and female copulatory organs strongly indicate that *P. armata* is most closely related to *P. nigra*. Similarities in the palpal organ also show a close relationship of these two species with *P. korinchica*. The

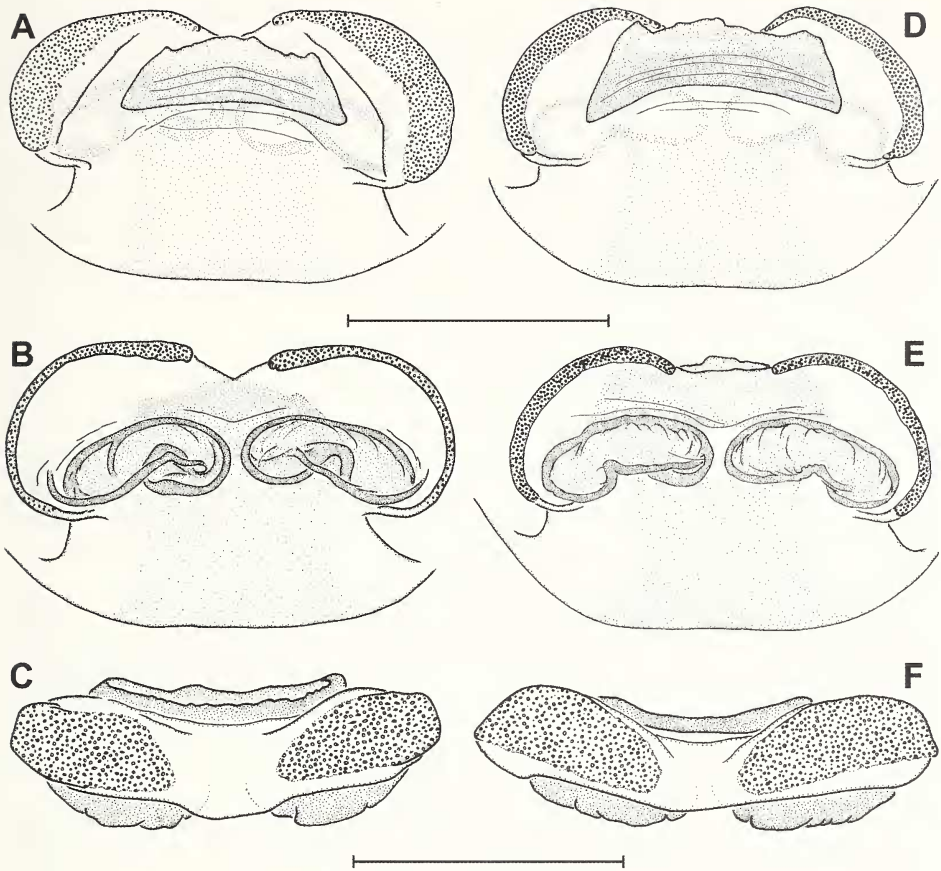


FIG. 26

Perania armata, two females (A-C; D-F). (A, D) Vulva, dorsal view. (B, E) Same, ventral view. (C, F) Same, anterior view. Scale lines 0.5 mm (A-B, D-E; C, F).

strongly developed pair of thoracic horns of *P. armata* is unique in the genus, but not without parallels in other genera. Less distinctly developed, paired thoracic protuberances (low mounds) are present in both sexes of *P. nigra*. These modifications in both species are probably homologous and synapomorphic, but are here not considered of generic significance.

DISTRIBUTION AND HABITAT: Known from four localities in the mountains near Padang in western Sumatra (Fig. 1, localities 27, 29-31). The new specimens were collected by sifting leaf litter in a disturbed upland rain forest. No webs were seen, but it is likely that *P. armata* lives in irregular sheetwebs which, according to the size of these spiders, are smaller than in congeners.

REMARKS: The two female syntypes described by Thorell were lost during the 1970 flooding of the MCSNG (Bourne, 1980: 250; Lehtinen, 1981: 17) and still cannot be traced (M. Tavano, personal communication).

I cannot confirm that *P. armata* has "Abdominal plates slightly reduced when compared with *Paculla*, *Lamania* and *Sabahya*, but postgenital and preanal plates easily recognizable" (Lehtinen, 1981: 16) and that its pattern of opisthosomal scuta is "intermediate between the normal pattern in *Pacullini*, and the strongly reduced pattern in *Perania*" (Lehtinen, 1981: 17). In the *P. armata* specimens examined the opisthosomal pattern of sclerites lies within the variation of the genus, is typical for the species on Sumatra, and (with regards to the anterior opisthosomal plate of females and the postgenital plate of males) is even more derived than that of *P. nigra*. What Lehtinen refers to as the isolated postgenital plate of the male neotype are obviously the median ventrolateral plates which are connected by a narrow bridge (see Lehtinen, 1981: fig. 12).

It is true that the posterior sternal process of *P. armata* is weakly developed (Lehtinen, 1981: 76). It is smaller than in other *Perania* species, but only indistinctly smaller than the one of *P. nigra*. Nevertheless the sternal process of *P. armata* is posteriorly wide (wider than at the base) and truncate (see Lehtinen, 1981: fig. 12), as in all other *Perania* species (see Schwendinger, 1989: figs 7, 13), whereas in *Sabahya*, *Paculla* and *Lamania* it is conical or domed (see Lehtinen, 1981: fig. 24; Schwendinger, 1989: fig. 2). With respect to this character *P. armata* lies at the lower end of the variation within *Perania*, but not outside it.

Lehtinen (1981: 17) regarded the male palp of *P. armata* as "close to that of *P. picea*", but I see much stronger similarities with the palp of *P. nigra* (Fig. 25 cf. Fig. 22).

***Perania picea* (Thorell, 1890)**

Figs 27-29

Phaedima picea Thorell, 1890: 305 (description of male and female).

Paculla picea (Thorell, 1890). – Simon, 1894: 573 (transfer).

Perania picea (Thorell, 1890). – Bourne, 1980: 254, figs 6-11 (redescription of types; designation of lectotype; transfer). – Lehtinen, 1981: 16, figs 7, 11 (redescription of types; designation of lectotype; transfer).

Phaedima granulosa Thorell, 1881. – Levi & Levi, 1962: fig. 308 [free-hand drawing of male palp; not a synonym but a misidentification and confusion in labelling (see Lehtinen, 1981: 16)].

TYPES: MCSNG; ♂ lectotype and 1 ♀ paralectotype; Indonesia, Sumatra, West Sumatra Province, Singalang (= Gunung Singgalang; about 0°23'S, 100°21'E) near Bukittinggi; VIII.1878; leg. O. Beccari.

NEW MATERIAL EXAMINED: MHNG, sample Sum-00/12; 1 ♂, 1 ♀; Indonesia, Sumatra, Jambi Province, Gunung Kerinci, footpath to summit, W of Kersik Tua (about 1°44'S, 101°15'30"E), 1800-1980 m; 16.II.2000; leg. P. J. Schwendinger.

DIAGNOSIS: Large species. Males distinguished by indistinct clypeal process in combination with shallow embolus lacking a subapical ventral lamella and ending in an even shallower, pointed, hook-shaped apex carrying a distinct, triangular, distad-directed subterminal lamella; females distinguished by long genital atrium in combination with kidney-shaped spermathecae containing large internal chambers with strongly broken walls.

RE-DESCRIPTION: Both sexes with small marginal teeth posterolaterally on "thoracic" portion of carapace; cowpat-shaped tubercles on carapace low, indistinct; anterior portion of fovea pitlike and slightly wider than posterior portion. Males with

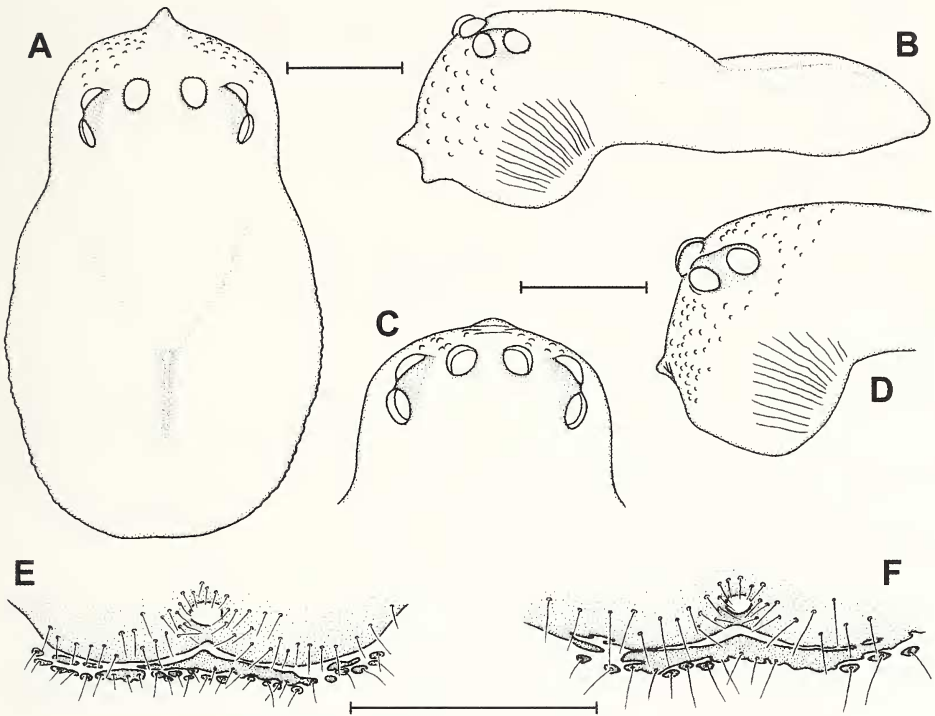


FIG. 27

Perania picea, male lectotype (A-B, E), new male (C-D, F). (A) Carapace, dorsal view. (B) Same, lateral view. (C) Anterior portion of carapace, dorsal view. (D) Same, lateral view. (E-F) Rudiment of postgenital plate at posterior margin of pulmonary plate, ventral view. Scale lines 1.0 mm (A-D; E-F).

a short, conical clypeal process (Fig. 27A-D); no chelical modifications; few conical setal bases prolaterally to proventrally in distal portion of tibia I, and several such tubercles prolaterally to proventrally along most of metatarsus I, none on leg II; anterior pair of ventrolateral plates largely free, only their posterior tips fused with margin of pulmonary plate; postgenital plate at least medially not fused with pulmonary plate (Fig. 27E-F); all microplates on posterior side of opisthosoma isolated; cymbium with relatively long and shallow apex (Fig. 28E, J); bulbus ovoid; with a U-shaped transition to embolus; the latter long and sigmoid, its distal portion sharply tapering to a hook-shaped apex with a short, triangular or widely rounded, distad-directed subterminal lamella at the base, and with a relatively long, pointed, ventrad-directed embolic part (Fig. 28A-D, F-I); no subapical ventral lamella as in *P. harau* sp. n. Females with anterior opisthosomal plate fragmented into microplates, several of these slightly larger than the rest; preanal plate completely fragmented; vulva with an unusually long genital atrium with a strong pigmentation over entire width of its ventral wall (Fig. 29A-B); spermathecae kidney-shaped, with a shallow invagination in common anterior margin and with a pair of widely separated, not inter-

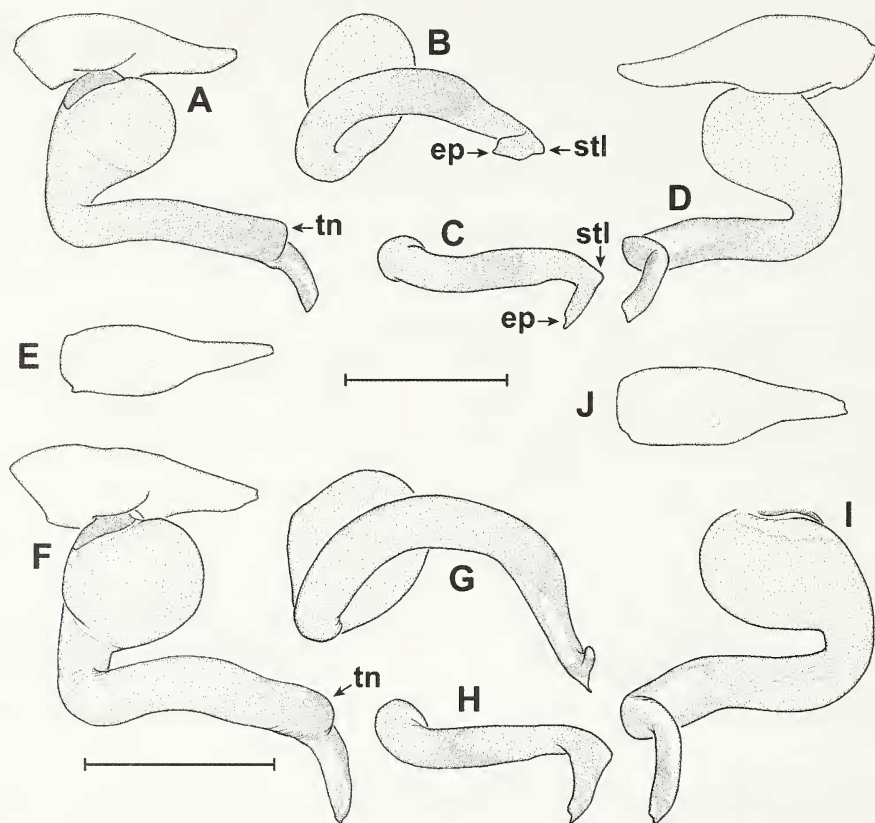


FIG. 28

Perania picea, left palp of male lectotype (A-E) and of new male (F-J). (A, F) Cymbium and palpal organ, proventral view. (B, G) Palpal organ, ventral view. (C, H) Embolus, distal view. (D) Cymbium and palpal organ, retrodorsal view. (E, J) Cymbium, dorsal view. (I) Palpal organ, retrodorsal view. Abbreviations: ep = embolic part of apex of palpal organ), stl = subterminal lamella, tn = sharp transition from deeper median portion of embolus to shallower apex. Scale lines 1.0 mm (A-D, F-I; E, J).

connected internal chambers with broken prolateral and retrolateral walls (Fig. 29B); anterolateral sides of spermathecae without trenches (Fig. 29C); porepatches large, extending far onto dorsal side of spermathecae; anterior collar of vulva short and wide, only little surpassing common anterior margin of spermathecae (Fig. 29A).

VARIATION AND MEASUREMENTS: The types are slightly smaller than the new specimens. Carapace length in two males (two females) is 4.5-4.7 (4.8-4.9), carapace width 2.7-2.8 (3.0-3.3). The male lectotype has a slightly longer clypeal process (Fig. 27A-B cf. Fig. 27C-D) and a shallower cymbial apex (Fig. 28E cf. Fig. 28J) than the new male. In the lectotype the postgenital plate is not connected to the pulmonary plate (Fig. 27E), in the new male it is fused laterally (at least on one side) but still free medially (Fig. 27F). The lectotype has several conical setal bases prolaterally and

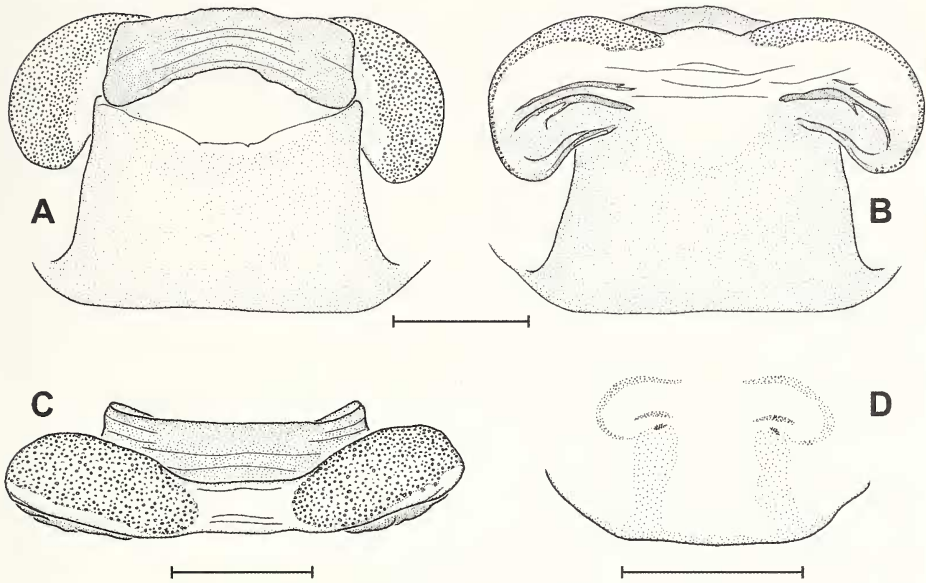


FIG. 29

Perania picea, new female (A-C) and female paralectotype (D). (A) Vulva dorsal view. (B) Same, ventral view. (C) Same, anterior view. (D) Posterior portion of pulmonary plate showing outlines of underlying vulva, ventral view. Scale lines 0.5 mm (A-B; C; D).

proventrally in the distal half of tibia I, whereas the new male has there only one on the right leg and none on the left leg. The new female has a relatively wider dorsal opisthosomal plate than the female paralectotype, being only slightly longer than wide.

RELATIONSHIPS: Judging from the shape of fovea and vulva, *P. picea* belongs in the *nigra*-group, closest to *P. harau* sp. n. These two species share a small clypeal process in males, a long sigmoid embolus with a small to very small distad-directed subterminal lamella and a relatively long and shallow, ventrad-directed embolic part of the apex. They also possess a long and entirely pigmented ventral wall of the genital atrium, somewhat kidney-shaped spermathecae enclosing a pair of internal chambers with thin, entire or broken walls, and a short but wide (almost as wide as the genital atrium) anterior collar.

DISTRIBUTION: *Perania picea* was described from Gunung Singgalang (Fig. 1, locality 29) and later collected on Gunung Kerinci (Fig. 1, locality 32), two volcanoes in the Bukit Barisan range of western Sumatra, about 180 km away from each other. I have some doubts whether the type specimens of *P. picea* were really collected on or near Gunung Singgalang, which is also the type locality of *P. armata* and *P. nigra*.

BIOLOGY AND REMARKS: I collected several *Perania* at two places in the rain forest along the footpath to the summit of Mt Kerinci. Not recognizing in the field that they belong to different species, I did unfortunately not keep them apart. However, I remember having collected fully pigmented specimens from webs on a stream bank

below the second shelter at 1980 m. These are most likely the specimens that I here attribute to *P. picea*.

The female paralectotype was not dissected, but the outlines of the vulva are visible from under the cuticle of the pulmonary plate (Fig. 29D). These correspond perfectly well to the vulva of the newly collected female (Fig. 29B).

In their revision of theridiid spider genera, Levi & Levi (1962: fig. 308) published a free-hand sketch of the palp of a *Perania* male deposited in the Genoa Museum, which they incorrectly attributed to *Phaedima granulosa* (now in *Paculla*). Lehtinen (1981: 16) assumed that this sketch depicts *Perania nigra*. I rather believe that it shows the palp of the male lectotype of *P. picea*, with the strange subterminal swelling of the embolus corresponding to the sharp transition from the deeper median portion of the embolus to the shallower apex (see Fig. 28A). What looks like a sub-terminal dorsal boss or bulge in Fig. 28A and Fig. 28F is in fact that transition.

***Perania korinchica* Hogg, 1919**

Fig. 30

Perania korinchica Hogg, 1919: 81-83, pl. 7, fig. 1a-b, d-f [description of female (prosoma only)].

Perania picea (Thorell, 1890). – Shear, 1978: 41 (note on composite specimen). – Lehtinen, 1981: 16 (synonymisation). – Platnick, 2013 (listing as a junior synonym).

TYPE: Natural History Museum London; prosoma of ♀ holotype (not examined); Indonesia, Sumatra, Jambi Province, Korinchi Peak (= Gunung Kerinci), Sungei Kumbang, 4700 ft; early 1914; leg. H. C. Robinson & C. Boden Kloss.

NEW MATERIAL EXAMINED: MHNG, sample Sum-00/12; 1 mature ♂, 1 juvenile ♂; Indonesia, Sumatra, Jambi Province, Gunung Kerinci, footpath to summit, W of Kersik Tua (about 1°43'30"S, 101°15'30"E), 1800-1980 m; 16.II.2000; leg. P. J. Schwendinger.

DIAGNOSIS: Male similar to that of *P. nigra*, distinguished by: larger size, a short process on clypeus, no paired humps on "thoracic" portion of carapace, smaller tubercles on lateral margin of carapace, a more strongly bent embolus, a deeper sub-terminal lamella with a more rounded upper corner, and a slightly larger, hook-shaped embolic part situated further back and directed ventrad.

DESCRIPTION OF MALE (newly moulted specimen): Colour (in alcohol) mostly light brown, carapace and chelicerae slightly darker; dorsal scutum of opisthosoma grey-brown, membranous parts of opisthosoma cream-coloured. Clypeus with short (occupying only 3% of carapace length), asymmetrically pointed median process (Fig. 30A-B). Fovea distinct, its anterior portion a round pit, its posterior portion a shallow longitudinal furrow. Total length 7.2. Carapace 3.7 long, 2.4 wide. Eye sizes and inter-distances: PME 0.29 long, separated by 0.09; ALE 0.27 long; ALE-PLE 0.06; PLE 0.25 long, separated by 0.90. Labium 0.7 long, 0.9 wide. Sternum 2.4 long, 1.7 wide. Chelicerae without modifications; with two teeth on anterior margin of fang furrow.

Palp 3.4 long (1.0+0.5+0.9+1.0). Cymbium (Fig. 30C, E) of typical shape, with a pointed but not unusually narrow apex. Palpal organ with ovoid bulbus and long sigmoid embolus, its median portion deep and in contact with bulbus on both palps; apex of embolus with a deep, paddle-shaped and obliquely truncate subterminal lamella, and with a small, shallow, hook-shaped and ventrad-directed embolic part distinctly set back from distal margin of embolus (Fig. 30C-H).

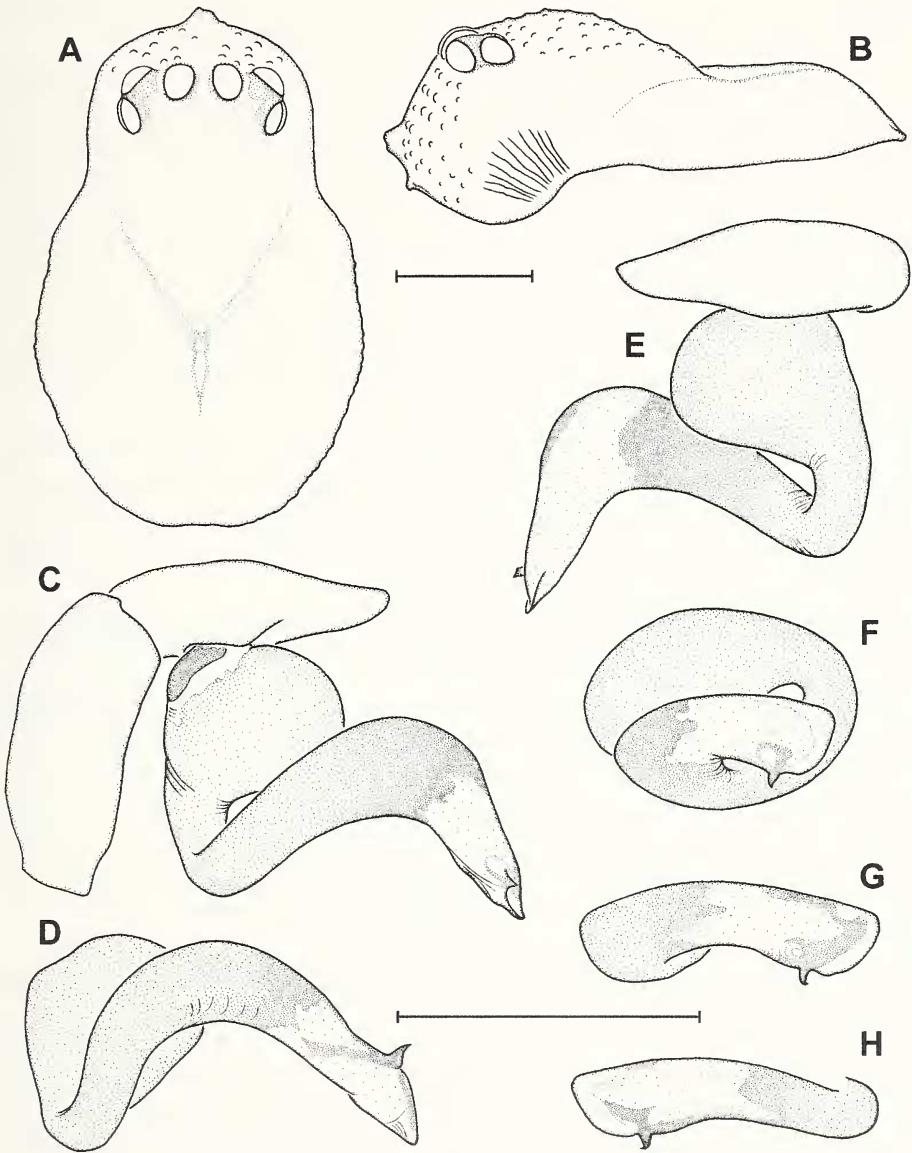


FIG. 30

Perania korinchica, male. (A) Carapace, dorsal view. (B) Same, lateral view. (C) Distal portion of left palp, proventral view. (D) Left palpal organ, ventral view. (E) Left palpal organ and cymbium, retrodorsal view. (F) Left palpal organ, distal view. (G) Left embolus, distal view (slightly more inclined than in F). (H) Right embolus, distal view. Scale lines 1.0 mm (A-B; C-H).

Legs 3241. Seven conical setal bases distributed over almost entire length of metatarsus I prolaterally and proventrally, three/five over distal third of tibia I prolaterally. Paired leg claws with a row of 10-14 teeth; unpaired leg claws with one den-

ticle. Leg I 13.0 long (3.8+1.5+4.1+2.4+1.2), leg II 10.3 long (3.0+1.2+2.9+2.1+1.1), leg III 8.1 long (2.5+1.0+2.0+1.9+0.7), leg IV 10.5 long (3.1+1.1+2.7+2.6+1.0).

Opisthosoma 3.9 long, 2.7 wide. Dorsal scutum 3.5 long, 2.4 wide, somewhat oval, posteriorly wider than anteriorly, its posterior margin straight, smooth. All microplates flat, those in five bands on posterior side of opisthosoma partially fused, forming broken strap-like horizontal plates. A few lateral microplates of lowest band in anterior portion of opisthosoma fused with each other (representing remnants of lateral plates) before running into lateral margin of pulmonary plate. Pulmonary plate 3.0 long, 2.2 wide; genital region flat. Anterior pair of ventrolateral plates largely fused with lateral margin of pulmonary plate, only their anterior tips free. Postgenital plate largely fused to pulmonary plate, with a narrow membranous slit behind gonopore marking border between both plates. Preanal plate 0.2 long, 0.9 wide, irregularly trapezoid. Anal plate 0.7 long, 1.1 wide.

FEMALE: The holotype of this species is the prosoma of a female (Hogg, 1919: 81-83, fig. 1a-b, d-f, not fig. 1c) and it thus provides hardly any distinctive characters. The isolated opisthosoma described and illustrated together with the holotype prosoma actually belongs to a *Leucauge* female in the distantly related spider family Tetragnathidae (see Shear, 1978: 41; Lehtinen, 1981: 16).

RELATIONSHIPS: Morphology of the male palp indicates a close relationship with *P. nigra* and *P. armata*.

DISTRIBUTION: Known only from the type locality, Gunung Kerinci, an active volcano and the highest mountain of Sumatra (Fig. 1, locality 32).

BIOLOGY AND REMARKS: The new specimens of *P. korinchica* and *P. picea* were all collected during my ascent to the summit of Gunung Kerinci and were all put into the same sample (Sum-00/12). According to field notes, the *P. korinchica* specimens were probably collected at 1800 m, from under decaying wood on the floor of a very humid, upland rain forest near the first shelter along the footpath to the summit.

As two *Perania* species are present on Mt Kerinci, one cannot rule out that the female holotype of *P. korinchica* (represented only by a prosoma without relevant specific characters) belongs to *P. picea*, but body size and altitudinal occurrence indicate otherwise. The two species on Mt Kerinci differ in size, and it seems that they occur at different altitudes: the larger one higher up (at 1980 m) than the smaller one (at 1800 m). The holotype of *P. korinchica* was collected at a relatively low altitude (4700 feet = ca 1430 m), and it is clearly smaller than the females of *P. picea* examined (carapace length of *P. korinchica* holotype: 4.5, of *P. picea* females: 4.8-4.9). Thus it is most likely that the new specimens from 1800 m are conspecific with the type of *P. korinchica*.

An embolus, which is so strongly curved upwards that its median portion is in contact with the bulbus of the palpal organ, was not found in any other *Perania* species. It may, however, not be a specific character but a deformation caused by the fact that the spider was preserved shortly after moulting and therefore the palpal organs may not be fully expanded. The asymmetrical clypeal process is presumably due to individual variation and not characteristic for the species.

Perania deelemanae sp. n.

Figs 31-33

HOLOTYPE: MHNG, sample Sum-00/18; ♂; Indonesia, Sumatra, Bengkulu Province, Lembah Sungai Ketahun Hulu, about 70 km NW of Curup, road from Muara Aman to Ketenong (about 2°53'S, 102°03'E), 730 m; 24.II.2000; leg. P. J. Schwendinger.

PARATYPES: MHNG, sample Sum-00/18; 1 ♂, 2 ♀ (one of them the "allotype"); same data as for holotype. – MHNG, sample Sum-00/19; 1 ♂, 2 ♀; Indonesia, Sumatra, Bengkulu Province, Taba Penanjung Reserve, road from Taba Penanjung to Kepahiang (about 3°41'S, 102°32'30"E), 630-770 m; 27.II.2000. All leg. P. J. Schwendinger.

ETYMOLOGY: This species is dedicated to Christa Deeleman-Reinhold, a distinguished Indonesian-born expert in Tetrablemmidae and in spiders of Indonesia.

DIAGNOSIS: Similar to *P. nigra*, both sexes distinguished by larger size, lacking humps on "thoracic" portion of carapace, and possessing conical microplates on anterior side of opisthosoma. Males distinguished by a distinct clypeal process, a longer cymbium, and a somewhat lanceolate apex of embolus. Females distinguished from those of *P. nigra* by an indistinct clypeal tubercle (not present in all specimens), a fragmented (but incompletely so) anterior opisthosomal plate, a longer anterior vulval collar, and spermathecae with a less strongly invaginated common anterior margin and with medially not interconnected, more thick-walled internal chambers enforced with ribs.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) generally dark brown, carapace, chelicerae and ventral sclerites darker than other sclerites; membranous parts of opisthosoma light grey-brown. Clypeus with medium-sized digitiform median process (Fig. 31A-B). Fovea composed of an indistinct anterior pit continuing into a shallow longitudinal furrow. Total length 9.2. Carapace 4.7 long, 2.5 wide; clypeal process 0.7 long, occupying 14% of carapace length. Eye sizes and interdistances: PME 0.26 long, separated by 0.16; ALE 0.26 long; ALE-PLE 0.08; PLE 0.26 long, separated by 1.09. Labium 0.8 long, 1.0 wide. Sternum 2.6 long, 1.8 wide. Chelicerae without modifications; right chelicera with two teeth on anterior margin of fang furrow, left one with one tooth.

Palp 4.0 long (1.1+0.6+1.1+1.2). Cymbium with relatively long, narrowly truncate apex (Fig. 32A). Palpal organ with ovoid bulbus and long, sigmoid embolus, transition between them U-shaped (Fig. 32C); embolus fairly straight in proximal portion, bent in distal portion; apex of embolus deep and somewhat lanceolate, with short, widely rounded subterminal lamella, and obliquely truncate embolic part with its narrowly rounded upper corner projecting far beyond its widely rounded lower corner and far beyond the subterminal lamella (Fig. 32B, D-E).

Legs 3241. Seven (on right side) and eleven (on left side) conical setal bases distributed over almost entire length of metatarsus I prolaterally and proventrally, four (on right side) and five (on left side) over distal half of tibia I prolaterally. Paired leg claws with a row of 13-14 teeth on anterior legs, 10-11 on posteriors; unpaired leg claws with one denticle. Leg I 16.4 long (5.0+1.6+5.2+3.2+1.4), leg II 13.0 long (3.8+1.4+3.7+2.8+1.3), leg III 10.1 long (3.0+1.1+2.4+2.5+1.1), leg IV 13.4 long (4.0+1.3+3.5+3.4+1.2).

Opisthosoma 4.5 long, 3.2 wide. Dorsal scutum 4.1 long, 2.7 wide, somewhat oval, posteriorly wider than anteriorly, its surface with indistinct low tubercles and

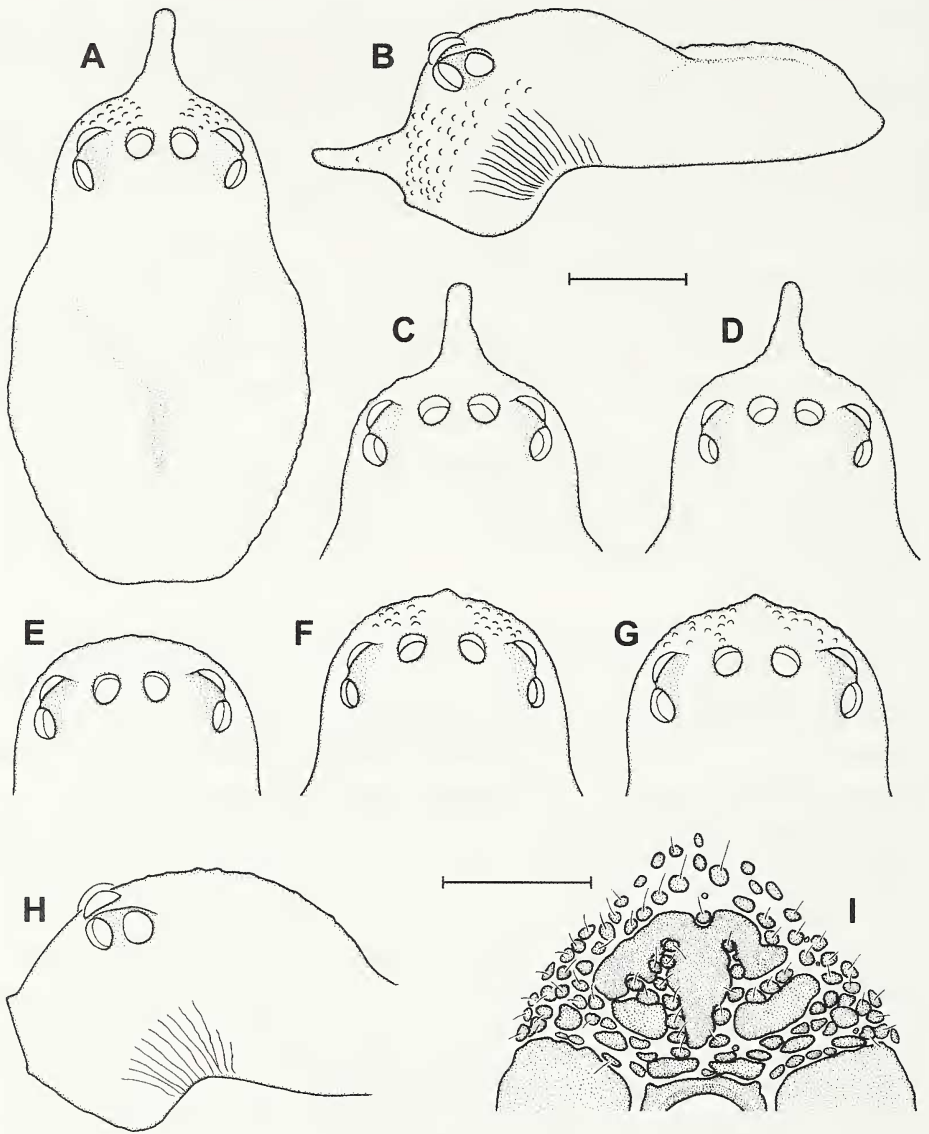


FIG. 31

Perania deelemanae sp. n., male holotype (A-B), male paratype from type locality (C), male paratype from Taba Penanjung (D), two female paratypes (E-F), female "allotype" (G-I). (A) Carapace, dorsal view. (B) Same, lateral view. (C-G) Anterior portion of carapace, dorsal view. (H) Same, lateral view. (I) Upper anterior side of opisthosoma showing fragmented anterior plate. Scale lines 1.0 mm (A-H; I).

ridges. A few microplates fused to anterior margin of pulmonary plate being slightly elevated and conical; all other microplates flat. Lateral microplates in anterior portion of opisthosoma relatively large, quadrangular and closely packed; a few microplates in lowest band anterolaterally on opisthosoma fused with each other. Four broken

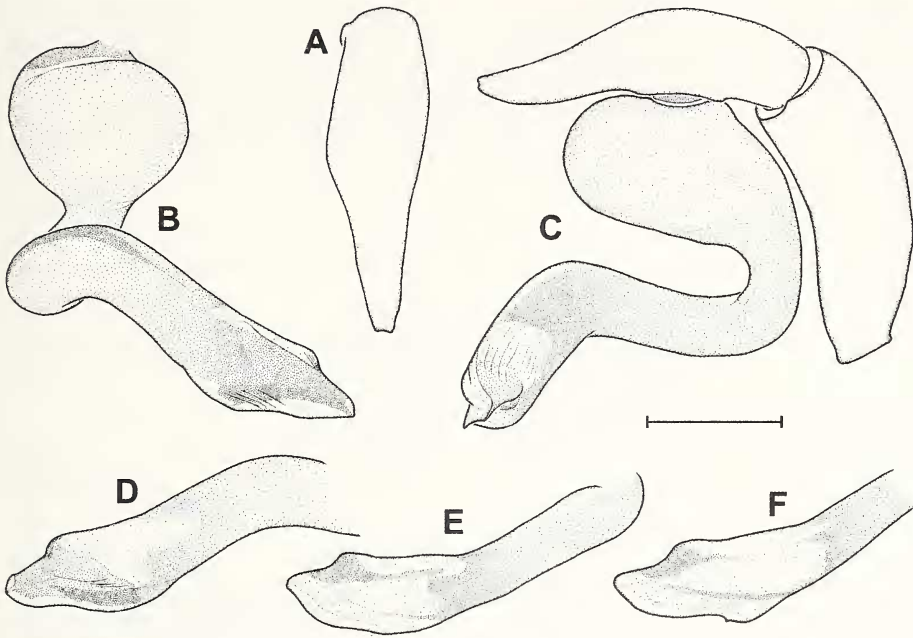


FIG. 32

Perania deelemanae sp. n., male holotype (A-E), male paratype from Taba Penanjung (F). (A) Left cymbium, dorsal view. (B) Left palpal organ, distal view. (C) Distal portion of left palp, retrodorsal view. (D, F) Apex of left embolus, proximal view. (E) Apex of right embolus, distal view. Scale line 0.5 mm.

horizontal strap-like plates on posterior side of opisthosoma. Pulmonary plate 3.1 long, 2.4 wide; genital region flat. Anterior pair of ventrolateral plates largely fused with lateral margin of pulmonary plate, only anterior tips free. Postgenital plate completely fused to pulmonary plate, linked by an indistinct sclerotised suture. Preanal plate 0.2 long, 0.8 wide, somewhat elliptical, with distinctly convex anterior margin and indistinctly concave posterior margin. Anal plate 0.9 long, 1.2 wide.

DESCRIPTION OF FEMALE ("allotype"): As in male, except for the following. Colour slightly darker, especially of legs and dorsal scutum. Total length 9.4. Carapace 4.6 long, 2.8 wide. PME 0.30 long, 0.23 apart; ALE 0.30 long, ALE-PLE 0.10; PLE 0.29 long, 1.38 apart. Clypeal process developed as an indistinct conical tubercle (Fig. 31G-H). Fovea with pronounced anterior pit. Labium 0.8 long, 1.1 wide. Sternum 2.8 long, 2.0 wide. Palp 3.8 long (1.0+0.6+0.8+1.4). Legs 3241; tibia I and metatarsus I without conical setal bases. Paired leg claws with 14-17 teeth on anterior legs, 10-13 on posteriors. Leg I 14.8 long (4.4+1.5+4.4+3.1+1.4), leg II 12.3 long (3.6+1.4+3.4+2.7+1.2), leg III 10.0 long (3.0+1.2+2.3+2.4+1.1), leg IV 13.0 long (3.9+1.3+3.3+3.3+1.2).

Opisthosoma 5.4 long, 3.9 wide. Dorsal scutum 3.9 long, 2.7 wide, its surface with indistinct tubercles. Anterior plate fragmented into several microplates and three small plates, the median one of them being inverted anchor-shaped (Fig. 31I). A few

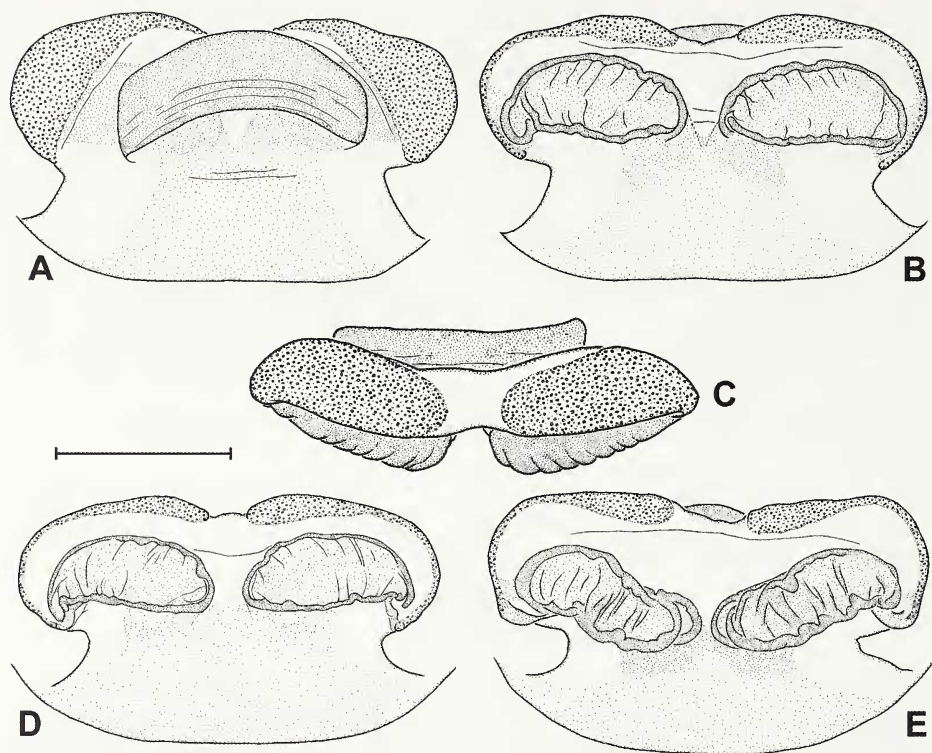


FIG. 33

Perania deelemanae sp. n., females; "allotype" (A-C), paratype from the type locality (D), paratype from Taba Penanjung (E). (A) Vulva dorsal view. (B, D-E) Same, ventral view. (C) Same, anterior view. Scale line 0.5 mm.

isolated microplates above dorsal margin of partially fragmented anterior plate and several microplates near posterior and posterolateral margin of dorsal plate slightly elevated and conical. All microplates on posterior and lateral sides of opisthosoma isolated. Pulmonary plate 2.5 long, 2.7 wide; genital region bulged, with curved wrinkles; posterior margin straight. Preanal plate reduced to a horizontal, compass-needle-shaped sclerite. Anal plate 0.9 long, 1.2 wide.

Vulva relatively short; anterior collar short, its widely rounded anterior margin only slightly surpassing common anterior margin of spermathecae in the middle (Fig. 33A); spermathecae short and wide, with an indistinct median invagination in common anterior margin, ventral side between porepatches and internal chambers unpigmented, anterior and lateral sides bulged, without trenches (Fig. 33C); porepatches extending far onto dorsal side of spermathecae; ventral wall of spermathecae with a pair of large, grain-shaped internal chambers with thick walls and longitudinal enforcement ribs; both chambers prominent (especially near middle of vulva), distinctly separated from each other, without interconnecting bridge (Fig. 33B); ventral wall of genital atrium with pigmented median zone sharply outlined and posteriorly widened, lateral zones unpigmented (Fig. 33A-B).

VARIATION: Carapace length in three males (four females) ranges 4.7-5.1 (4.2-4.6), carapace width 2.5-2.7 (2.7-2.8). Variation in the shape of the clypeal process of males is shown in Fig. 31A-D. Three females have a small, conical, pointed tubercle on the clypeus (Fig. 31F-H), one female lacks such a tubercle (Fig. 31E). The sclerotised suture linking the pulmonary plate and the postgenital plate is distinct in one male, indistinct in the two others. The female "allotype" has the large central fragment of the anterior opisthosomal plate in the shape of an inverted anchor (Fig. 31I), in the other three females examined it is a simple longitudinal bar which is dorsally slightly wider than ventrally. Only the female "allotype" has a quite wide rudimentary preanal plate, in the other conspecific females this is completely fragmented into microplates. Variation in the shape of the embolus of two males is shown in Fig. 32B, D-F, variation in the shape of the vulva of three females in Fig. 33B, D-E.

RELATIONSHIPS: The new species is most similar and probably most closely related to *P. selatan* sp. n.; *Perania nigra*, *P. armata* and *P. kirinchica* appear to be the closest relatives of these two species.

DISTRIBUTION: Known from two localities in the Barisan mountain range to the north and northeast of Bengkulu city (Fig. 1, localities 33-34).

BIOLOGY: The spiders examined were collected from webs on exposed earth-banks on one side of a dirt road running through fields (near a recently cleared patch of rainforest and not far from a stream) in the Lembah Sungai Ketahun Hulu, and from under decaying logs on the floor of a rain forest in the Taba Penanjung Reserve.

***Perania selatan* sp. n.**

Figs 34-35

HOLOTYPE: MHNG, sample Sum-00/27; ♂; Indonesia, Sumatra, Lampung Province, Bukit Barisan Selatan National Park, footpath to waterfall, 2 km from road Krui to Liwa, NE of Kubuprahu (5°04'S, 104°03'30"E), 600 m; 5.III.2000; leg. P. J. Schwendinger.

PARATYPES: MHNG, sample Sum-00/27; 7 ♀; same data as for holotype.

ETYMOLOGY: "Selatan" is the Indonesian word for "south". Noun in apposition.

DIAGNOSIS: Similar to *P. deelemanae* sp. n., both sexes distinguished by smaller body size and PME interdistance equal to their diameters (distinctly less so in *P. deelemanae* sp. n.). Male distinguished from those of *P. deelemanae* sp. n. by shorter, more conical clypeal process; lateral microplates in anterior portion of opisthosoma not quadrangular, several of those in lower rows fused into short strap-like lateral plates; conical microplates on anterior side of opisthosoma more distinctly elevated; tip of cymbium narrower; apex of embolus shallower, obliquely truncate, without (or with only very indistinct) subterminal lamella dorsally. Females without clypeal process; common anterior margin of spermathecae with a deeper median invagination; internal chambers of spermathecae with stronger enforcement ribs, usually closer to each other than in *P. deelemanae* sp. n.

DESCRIPTION OF MALE (holotype): Colour (in alcohol) generally dark brown, carapace, chelicerae, pedipalps, ventral sclerites and dorsal scutum slightly darker, palpal organ and distal articles of posterior legs lighter; membranous parts of opisthosoma grey-brown. Clypeus with short, basally quite narrow conical process

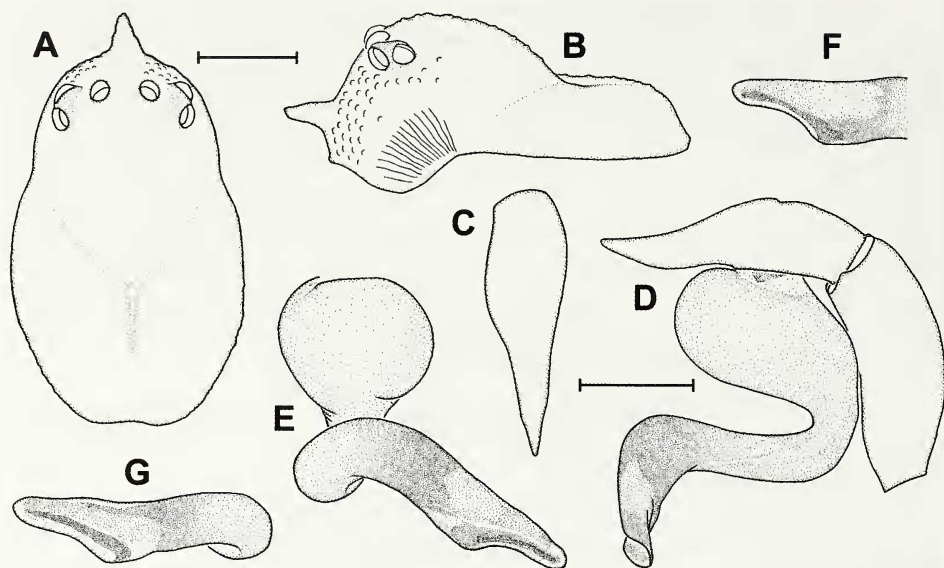


FIG. 34

Perania selatan sp. n., male holotype. (A) Carapace, dorsal view. (B) Same, lateral view. (C) Left cymbium, dorsal view. (D) Distal portion of left palp, retrodorsal view. (E) Left palpal organ, distal view. (F) Apex of left embolus, proximal view. (G) Apex of right embolus, proximal view. Scale lines 1.0 mm (A-B), 0.5 mm (C-G).

(Fig. 34A-B). Fovea relatively deep in anterior half. Total length 7.9. Carapace 4.0 long, 2.3 wide; clypeal process 0.4 long, occupying 9% of carapace length. Eye sizes and interdistances: PME 0.24 long, separated by 0.24; ALE 0.22 long; ALE-PLE 0.11; PLE 0.21 long, separated by 1.08. Labium 0.8 long, 1.0 wide. Sternum 2.3 long, 1.7 wide. Chelicerae without modifications; with two teeth on anterior margin of fang furrow.

Palp 3.7 long (1.0+0.5+1.0+1.2). Cymbium with long and exceptionally narrow, acutely pointed apex (Fig. 34C). Palpal organ with long embolus bent from bulbous at almost 180°, fairly straight in proximal portion, sigmoid in distal portion; apex of embolus only slightly deeper than median portion of embolus, obliquely truncate, its upper corner narrowly rounded and protruding far beyond widely rounded lower corner; no subterminal lamella discernible dorsally (Fig. 34D-G).

Legs 3241. Nine (on left side) and twelve (on right side) conical setal bases distributed over almost entire length of metatarsus I prolaterally to ventrally, three (on right side) and four (on left side) over distal quarter of tibia I prolaterally. Paired leg claws with a row of 13-14 teeth on anterior legs, 9-12 on posteriors; unpaired leg claws with one denticle. Leg I 14.8 long (4.4+1.4+4.8+3.0+1.2), leg II 11.5 long (3.2+1.2+3.4+2.6+1.1), leg III 9.2 long (2.7+1.0+2.3+2.2+1.0), leg IV 12.1 long (3.6+1.1+3.3+3.0+1.1).

Opisthosoma 4.4 long, 3.1 wide. Dorsal scutum 3.8 long, 2.8 wide, somewhat oval, posteriorly wider than anteriorly, posterior margin straight, its surface carrying

indistinct low tubercles and ridges. Most lateral microplates in anterior portion of opisthosoma medium-sized, elliptical, close to each other and only one row deep in each band; several of those in two lower bands completely fused with each other, forming short lateral strap-like plates (the lowest one longest) and representing remnants of lateral plates; some microplates on and above dorsal margin of pulmonary plate distinctly elevated and pointed; only one broken strap-like horizontal plate on posterior side of opisthosoma. Pulmonary plate 3.2 long, 2.5 wide; genital region flat. Anterior pair of ventrolateral plates largely fused with lateral margin of pulmonary plate, only anterior tips free. Postgenital plate completely fused to pulmonary plate, linked by an indistinct sclerotised suture. Preanal plate 0.2 long, 0.6 wide, with slightly convex anterior margin, straight posterior margin and irregular lateral margins. Anal plate 1.2 long, 1.8 wide.

DESCRIPTION OF FEMALE (“allotype”): As in male, except for the following. Total length 7.0. Carapace 3.4 long, 2.3 wide. PME 0.24 long, 0.26 apart; ALE 0.22 long; ALE-PLE 0.06; PLE 0.24 long, 1.10 apart. No clypeal process. Labium 0.7 long, 1.0 wide. Sternum 2.2 long, 1.6 wide. Palp 3.2 long (0.8+0.4+0.7+1.3). Legs 3241; tibiae and metatarsi I-II without conical setal bases. Paired leg claws with 12-14 teeth on anterior legs, 11-12 on posteriors. Leg I 11.4 long (3.4+1.1+3.3+2.4+1.2), leg II 9.6 long (2.9+1.0+2.6+2.1+1.0), leg III 7.9 long (2.3+0.9+1.9+1.9+0.9), leg IV 10.2 long (3.0+1.0+2.7+2.5+1.0).

Opisthosoma 4.4 long, 3.3 wide; several microplates in posterior portion near dorsal scutum slightly elevated and conical, all isolated. Dorsal scutum 3.0 long, 2.0 wide, its posterior margin straight, its surface with distinct tubercles and ridges between them. Anterior plate fragmented into three small plates and several microplates, some of the latter situated in the upper portion (corresponding to dorsal margin of fragmented anterior plate) elevated and pointed but slightly smaller than in males. Pulmonary plate 1.9 long, 2.0 wide; genital region bulged; outlines of light spermathecae clearly visible under cuticle; posterior margin widely rounded. Preanal plate completely fragmented. Anal plate 1.4 long, 1.9 wide.

Vulva (of paratype) relatively short; anterior collar short, its widely rounded anterior margin only little surpassing common anterior margin of spermathecae with a distinct median invagination (Fig. 35A); anterior and lateral sides of spermathecae bulged, without trenches (Fig. 35C); porepatches extending far onto dorsal side of spermathecae (Fig. 35A); ventral side of spermathecae with a paramedian pair of somewhat elliptical chambers with thick walls and strong transversal enforcement ribs; both chambers prominent and in contact with each other (Fig. 35B); ventral side of spermathecae between porepatches and internal chambers unpigmented; ventral wall of genital atrium with pigmented median zone clearly outlined, laterally biconcave (Fig. 35A-B).

VARIATION: Carapace length in seven females ranges 3.4-3.8, carapace width 2.3-2.5. The three larger central fragments of the anterior opisthosomal plate of females are variable in size: largest in the “allotype” and in another specimen, smaller in the remaining females. Variation in the shape of the embolus of the left and right palp of the holotype is shown in Fig. 34E-G, variation in the shape of the vulva of three females in Fig. 35B, E-D.

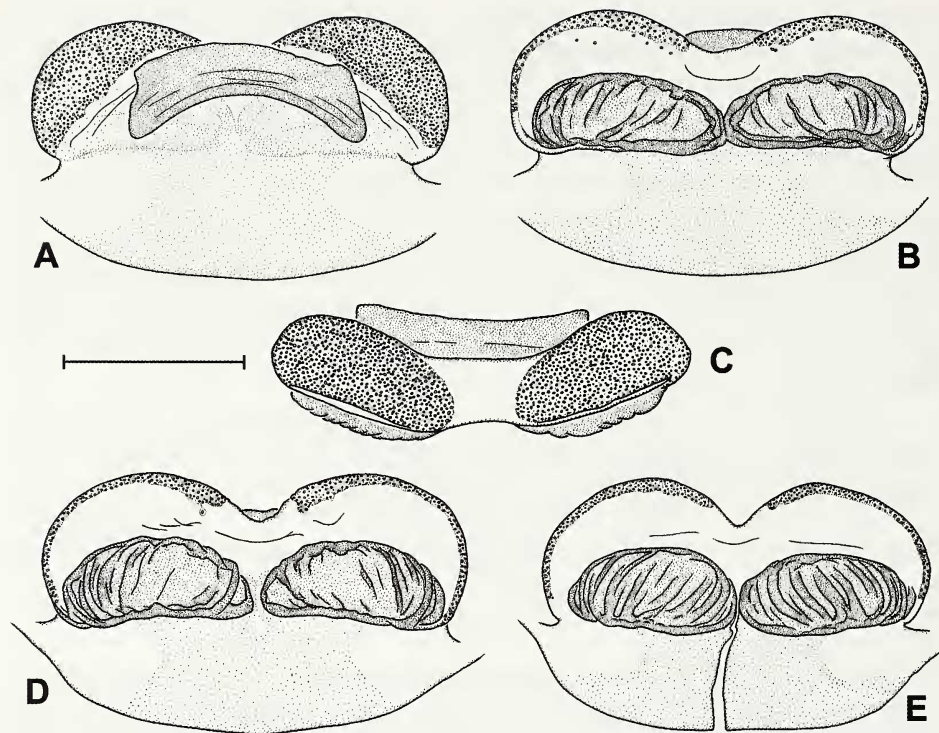


FIG. 35

Perania selatan sp. n., females; first paratype (A-C), second paratype (D), "allotype" (E). (A) Vulva dorsal view. (B, D-E) Same, ventral view (E with damaged atrium). (C) Same, anterior view. Scale line 0.5 mm.

REMARK: The exceptionally narrow cymbium (on both palps; Fig. 34C) of the holotype (the only available male) may not be characteristic of this species. The cymbium shape in *P. selatan* sp. n. could be as variable as in *P. picea* (cf. Fig. 28E, J).

RELATIONSHIPS: The new species is most similar and probably most closely related to *P. deelemanae* sp. n.; both appear closer to *P. nigra*, *P. armata* and *P. korinchica* than to the remaining species in the same group.

DISTRIBUTION: Known only from the type locality in southern Sumatra (Fig. 1, locality 35).

BIOLOGY: The spiders were collected from typical webs under decaying logs on the floor of a lush rain forest.

Perania spp.

MATERIAL EXAMINED: MHNG, sample 29b; 1 ♀; Indonesia, Sumatra, North Sumatra Province, 5 km N of Brastagi, Tongkoh (about 3°14'20"N, 98°30'30"E), 1450 m (mixed pine forest with many epiphytes); 3.XII.1989; leg. D. Burckhardt, I. Löbl & D. Agosti. – MHNG, sample SIM-01/03; 2 juveniles; Indonesia, Lingga Archipelago, Lingga Island, waterfall about 7 km N of Daik (00°08'53"S, 104°36'13"E), 60 m (rain forest along stream); 13.-15.VI.2001;

leg. P. J. Schwendinger. – MHNG, sample SIM-01/04; 1 juvenile; Indonesia, Lingga Archipelago, Singkep Island, Batu Ampar Waterfall, about 10 km NW of Dabo (00°29'31"S, 104°28'31"E), 80 m (rain forest along stream); 17./18.VI.2001; leg. P. J. Schwendinger. – SMF; 1 juvenile; Malaysia (peninsula), Pahang State, Fraser's Hill, Telecom loop (3°43'6.3"N, 101°45'9.86"E), 1300 m (primary forest along road); 16.VI.2013; leg. P. Jäger. All these specimens were collected by sifting.

REMARKS: The single female from near Brastagi (Fig. 1, locality 36) is the smallest known adult *Perania* specimen (total length 4.0 mm). It has a small conical tubercle on the clypeus, its anterior opisthosomal plate is completely (posteriorly and laterally) fused with the pulmonary plate (in other *Perania* spp. this is only the case in males), as are its spiracular plates (not so in other *Perania* females), it has the largest rudiment of a preanal plate among all *Perania* females examined (the latter three characters plesiomorphic), and its spermathecae contain a pair of internal ventral chambers. This specimen thus obviously represents an additional new species in the *nigra*-group, but without a conspecific male I do not want to formally describe and name it.

The three juveniles from two islands in the Lingga Archipelago (Fig. 1, localities 37-38) clearly belong to a *Perania* species (and not to a *Paculla* which co-occurs on the same islands) and thus are the only specimens of this genus from outside mainland SE-Asia and Sumatra.

The juvenile from Fraser's Hill (Fig. 1, locality 24A) could belong to *P. coryne*, to *P. cerastes* or to an undescribed species.

DISCUSSION

MORPHOLOGY AND TAXONOMY: A strong sclerotisation of the opisthosoma, with characteristic anterior, dorsal, lateral, ventrolateral, ventral and posterior plates (Shear, 1978: 8; Lehtinen, 1981: 5), is widespread and plesiomorphic in the Tetrablemmidae. Reductions of these sclerites in *Perania* are therefore apomorphic (Lehtinen, 1981: 77). Such are: dorsal plate relatively small (Fig. 37D) and anterior plate partly (Fig. 31I) or completely fragmented in females; lateral plates almost completely, posterior plates more or less strongly fragmented (Fig. 37B-D) in both sexes; ventral plates fused with each other in males (Fig. 36B-C), reduced or fragmented into microplates in females (Fig. 36E). *Perania* thus represents the most derived genus in the family, which is also indicated by the relatively large size of most of its species.

Perania males generally have a more primitive somatic morphology (closer to the "body plan" of the Tetrablemmidae) than females. (1) They have a distinctly larger dorsal opisthosomal plate than females (Fig. 37B-C cf. Fig. 37D). (2) Their anterior opisthosomal plate is always well-developed and completely integrated into the anterior margin of the pulmonary plate. This condition is found in all *Sabahya*, *Paculla* and *Lamania* females (as well as males), but in *Perania* females only in an undescribed species from Sumatra. In females of all other *Perania* species the anterior plate is reduced to various degrees: still present as an entire sclerite and fused along its ventral margin (but not along its lateral margins as in males) with the pulmonary plate in *P. nigra* (Fig. 21E); entire but completely separated from the pulmonary plate in *P. armata* (Fig. 24H-I); fragmented into three medium-sized plates and many microplates in

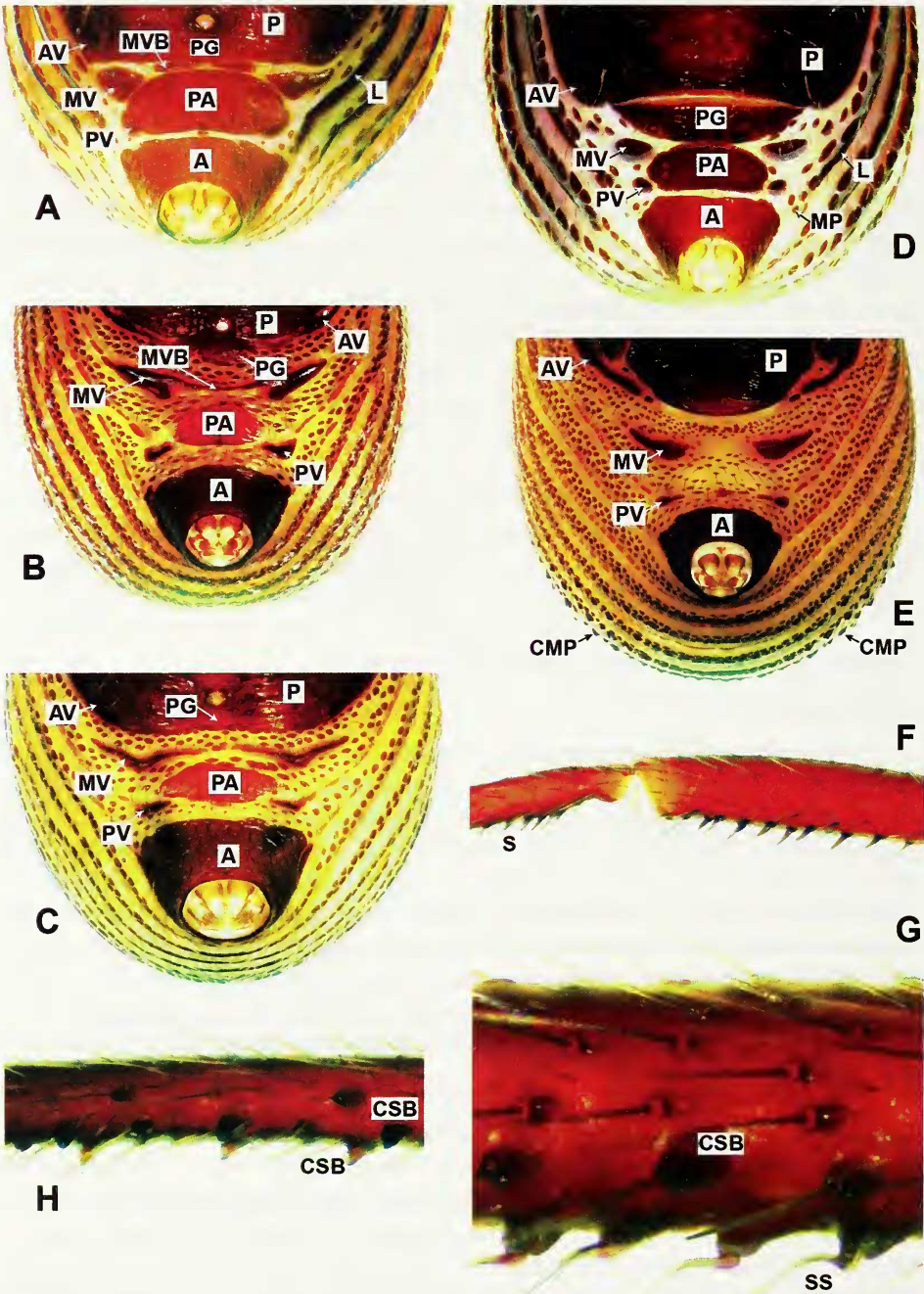


FIG. 36

Posterior portion of opisthosoma, ventral view (A-E) and right leg I, prolateral view (F-H). (A) *Sabahya bispinosa* Deeleman-Reinhold, 1980, male. (B) *Perania cerastes* Schwendinger, 1994,

P. deelemanae sp. n. (Fig. 31I) and *P. selatan* sp. n.; completely fragmented into microplates of roughly the same size in females of all remaining species. (3) The male holotype of *P. selatan* sp. n. (and to a lesser extent also males of *P. deelemanae* sp. n.) retains rudiments of lateral plates in the anterior portion of the opisthosoma. (4) The postgenital plate of *Perania* males is short, more or less completely fused to the posterior margin of the pulmonary plate, with a suture (sclerotised or membranous) linking both plates (Figs 27E-F, 36B-C). This condition is also found in males of other Pacullinae genera (Fig. 36A). In all *Perania* females the postgenital plate is completely fragmented into microplates (Fig. 36E), whereas in females of all other tetrablemmid genera the postgenital plate is a well-developed, isolated sclerite behind the epigastric furrow (in which lies the genital orifice) (Fig. 36D). (5) *Perania* males have a fairly well-developed preanal plate (Fig. 36B-C), whereas in *Perania* females the preanal plate is more or less strongly reduced: small but still recognizable as a plate in some *P. cerastes* females, or reduced to slightly enlarged posterior microplates that are laterally fused with each other and form a compassneedle-shaped transversal sclerite (Fig. 21F) (most pronounced in the female of an undescribed species from Brastagi), or completely fragmented into normal microplates (Fig. 36E). The unpaired tracheal spiracle lies on a microplate (recognizable by a short pigmented and sclerotised collar leading inside the opisthosoma) situated just behind the preanal plate (or its rudiments) and more or less strongly overlapped by the latter. If the preanal plate is completely fragmented, then the tracheal spiracle is freely visible as a small, dark median spot between the posterior pair of ventrolateral plates (Fig. 36E). In females of all other tetrablemmid genera the preanal plate is always entire and quite large (Fig. 36D), though slightly smaller than in the corresponding males (Fig. 36A). (7) Males of several species have up to seven strap-like horizontal plates posteriorly on the opisthosoma (Fig. 37B); these are fragmented into isolated microplates (Fig. 37D) in females of all species except *P. utara* sp. n. The strap-like horizontal plates presumably represent fragments of three to four posterior plates found in males and females of other tetrablemmid genera (Fig. 37A).

What I called the “postgenital plate (reduced to a pair of paramedian patches)” in my earlier descriptions of paculline males (Schwendinger, 1989, 1994) is actually the median pair of ventrolateral plates, called “perigenital plates” by Shear (1978: 8). Three pairs of such ventrolateral opisthosomal plates are present in *Perania* (Fig. 36B-C, E), and they can also be recognized in all other Pacullinae (Fig. 36A, D). (1) The posterior pair of ventrolateral plates is the smallest, it is somewhat oval and situated laterally between the anal plate and the preanal plate (if present). In the two known *Sabahya* and in some *Paculla* and *Lamania* species, but not in *Perania*, this pair is

male. (C) *Perania utara* sp. n., male holotype. (D) *Sabahya bispinosa*, female. (E) *Perania robusta* Schwendinger, 1989, female. (F) *Sabahya bispinosa*, male, distal portion of tibia and proximal portion of metatarsus. (G) *Perania cerastes*, male, median portion of metatarsus. (H) *Perania quadrifurcata* sp. n., male holotype, median portion of metatarsus. Abbreviations: A = anal plate; AV = anterior ventrolateral plate; CMP = conical microplate; CSB = conical setal base; L = lateral plate; MP = microplate (normal); MV = median ventrolateral plate; MVB = bridge or bridge fragments of MV (three MVB discernible below PG in Fig. 36D); P = pulmonary plate; PA = preanal plate; PG = postgenital plate; PV = posterior ventrolateral plate; S = spinule; SS = strongly sigmoid seta.

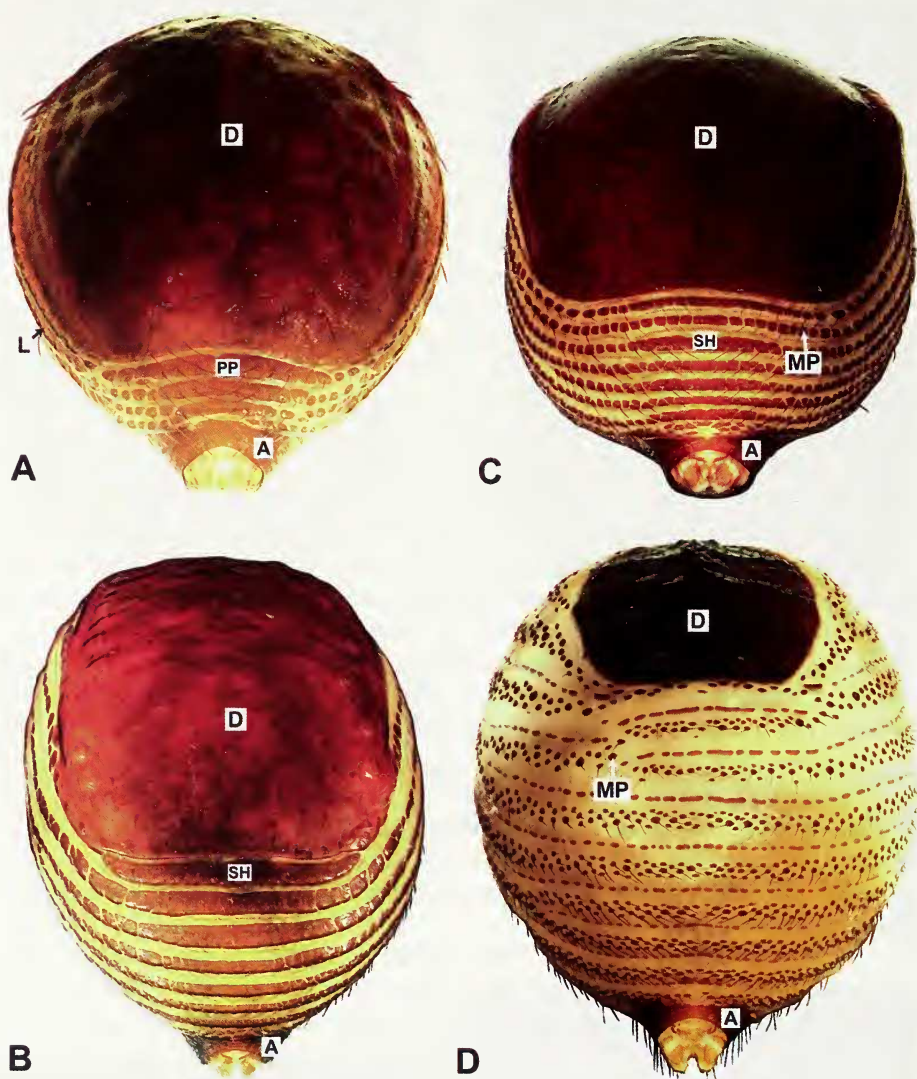


FIG. 37

Posterior side of opisthosoma, posterior view. (A) *Sabahya bispinosa* Deeleman-Reinhold, 1980, male, showing three posterior plates. (B) *Perania quadrifurcata* sp. n., male holotype, showing five entire (upper) strap-like horizontal plates and two broken (lower) ones. (C) *Perania utara* sp. n., male holotype, showing entire and broken strap-like horizontal plates. (D) *Perania nasuta* Schwendinger, 1989, female, showing bands of isolated microplates. Abbreviations: A = anal plate; D = dorsal plate; L = lateral plate; MP = microplate (normal); PP = posterior plate; SH = strap-like horizontal plate.

often (in males more often than in females) fused with the posterolateral margin of the preanal plate (Fig. 36A; free in conspecific female, Fig. 36D). (2) The median pair of ventrolateral plates ("perigenital plates" of Shear, 1978) is larger than the posterior pair, somewhat triangular and situated laterally between the preanal plate and the postgenital plate (if present). Left and right median ventrolateral plates are widely separated or connected to each other by a narrow median bridge (Fig. 36B). In *Perania* species this bridge is usually broken medially by a more or less wide gap (Fig. 36C), in other Pacullinae it is usually fragmented into one to four smaller sclerites (Fig. 36A); in females these sclerites are often partially hidden under the postgenital plate (Fig. 36D). Such small median sclerites anterior to the preanal plate are present in males and females of all *Sabahya* and of some *Paculla* and *Lamania*. They represent fragments of the bridge between the median ventrolateral plates, not fragments of the postgenital plate. (3) The anterior pair of ventrolateral plates is long and narrow, lying close to the lateral margin of the pulmonary plate, in *Perania* females always isolated (as are also the stigmal plates) (Fig. 36E), in males either isolated or more or less extensively fused with the pulmonary plate (Fig. 36B-C). In males and females of all *Sabahya* and some *Lamania* the anterior ventrolateral plates and the pulmonary plate (including the stigmal plates) are completely fused (Fig. 36A, D), in *Paculla* they are fused in all males and separated in females of some species. Apart from being paired and situated more laterally, all ventrolateral plates can be easily distinguished from the unpaired ventral plates by their finely granular surface microstructure (all ventral plates are essentially smooth, but may have wrinkles). The difference in surface microtexture is clearly discernible even when ventral and ventrolateral plates are fused with each other.

A character previously considered restricted to males is the presence of elevated setal bases (in the shape of conical tubercles; Fig. 36G-H, Schwendinger, 1994: fig. 2) prolaterally to ventrally on tibia I and metatarsus I (also on metatarsus II in the male holotype of *P. utara* sp. n.). Such structures are also present (but weaker than in males) in females of *P. egregia* sp. n. and *P. quadrifurcata* sp. n. In addition to these large conical setal bases, smaller blunt tubercles, carrying strongly sigmoid, proximally swollen, abruptly distad-bent setae (Fig. 36G), occur ventrally on the metatarsus I of males and females of *P. cerastes* and *P. coryne* and appear to be an apomorphy for the *cerastes*-group. Males and females of *P. robusta* possess similar, abruptly distad-bent ventral setae on metatarsus I (and less distinct also on metatarsus II), but they are less swollen proximally and straight (instead of sigmoid) above the proximal bend. A different kind of modified setae on leg I is found in males of the two *Sabahya* species: tiny, spine-like ventral setae in the distal half of tibia I and in the proximal third of metatarsus I (Fig. 36F). Males of *Paculla cameronensis* Shear, 1978 possess such ventral spinules on tibia I and proximally on a modified metatarsus I (see Shear, 1978: fig. 122; presumably conspecific males from Maxwell's Hill have no ventral spinules on tarsus I and distally on metatarsus I as indicated in that figure); males of *Paculla mului* (Bourne, 1981) have slightly longer spinules ventrally and proventrally on a modified tibia I and shorter ones ventrally in the proximal portion of a normal metatarsus I (see Bourne, 1981: figs 11, 14). All these modifications (verified using specimens deposited in the MHNG) probably provide a better grip on the partner during mating, but, as recognized by Lehtinen (1981: 77), they are not all homologous.

Conical setal bases on leg I are present in all *Perania* males, they are unique to the genus and thus another of its apomorphies.

Clypeal processes in *Perania* are more common than previously though. They are present in males of thirteen species (presumably also in the unknown male of *P. birmanica*) and surprisingly also in females of four species (*P. tumida* sp. n., *P. egregia* sp. n., *P. quadrifurcata* sp. n. and *P. deelemanae* sp. n.). As clypeal processes can be found in the Tetrablemininae (in *Brignoliella* and *Tetrablemma*) but not in any of the other Pacullinae, they are apomorphic for *Perania*.

Species in several paculline genera possess paired modifications in the "thoracic" portion of the carapace: *Sabahya kinabaluana* Deeleman-Reinhold, 1980 (males and females with two small horns); *S. bispinosa* Deeleman-Reinhold, 1980 (males and females with two fairly long horns); *Paculla granulosa* (Thorell, 1881) (males and females with two short horns); *Paculla* sp. from Lingga Island (males and females with two long horns); *Paculla* sp. male from Keningau (Sabah) (two short tubercles with two and three tips each); *Lamania nirmala* Lehtinen, 1981 (male and female with two long horns); *L. bernhardi* (Deeleman-Reinhold, 1980) (idem); *L. lipsae* Dierkens, 2011 (idem); *Lamania* sp. from Crocker Range, Sabah (idem). It is therefore not surprising to find such paired thoracic modifications also in two *Perania* species: *P. armata* with two long pointed horns, *P. nigra* with two low rounded humps. Both structures are here considered homologous. As these two species otherwise correspond well with other *Perania* species in somatic and genital morphology, there is no reason to separate them into a distinct genus - not even into a distinct species-group. Separating *P. armata* alone or together with *P. nigra* (which are both comfortably embedded in the *nigra*-group) from *Perania* would render this genus paraphyletic. *Mirania* is therefore kept in the synonymy of *Perania*. I have transferred *P. armata* to *Perania* and thus placed *Mirania* in its synonymy (Schwendinger, 1989: 579), but later expressed doubt about this decision (Schwendinger, 1994: 463). The discovery of new material of both sexes provides convincing support for maintaining this synonymy.

Another strongly autapomorphic species is *P. egregia* sp. n. (with an untypical cymbium and palpal organ), but clypeus modifications and vulva morphology show that it fits well in the *nasuta*-group. Only one species, *P. utara* sp. n., is sufficiently distinct from all other known species (by palp and vulva morphology) to deserve an isolated position within *Perania* but not outside it. As additional species can be expected to occur in the northern part of Sumatra, the *utara*-group will probably not stay monotypic for very long.

The characteristic paired structures of the spermathecae in the *utara*-group (external pouches) and in the *nigra*-group (internal chambers) appear to be synapomorphic. However, as species from Sumatra exhibit clearly more primitive character states than species from the mainland, it is quite possible that these spermathecal structures are also plesiomorphic in *Perania*. There are two indications for this: (1) the paired posterolateral compartments in the spermathecae of *P. quadrifurcata* sp. n. (belonging to the *nasuta*-group) are possibly homologous with the internal spermathecal chambers in the *nigra*-group, and (2) the laterally open spermathecal chambers with slivered walls of *P. picea*, and to a lesser extent also those of *P. nigra*, *P. armata* and *P. harau* sp. n. (all in the *nigra*-group), could represent different stages of reduction

of formerly thick-walled internal chambers which are still present in the spermathecae of *P. deelemanae* sp. n. and *P. selatan* sp. n. Paired spermathecal structures may thus have been lost (or modified in the case of *P. quadrifurcata* sp. n.) in the species from the mainland.

Unlike other authors who have published on *Perania*, I see little or no taxonomically important information in the paired depressions (sigilla) in the genital region of the pulmonary plate. These structures (called "external epigynal areas" by Lehtinen, 1981: 78) are present in both sexes and their shape is quite uniform among the species examined.

In summary, the status of *Perania* as a monophyletic group within the Pacullinae is well supported by the following eleven apomorphies: (1) conically elevated setal bases prolaterally to ventrally on tibia I and metatarsus I of males (rarely also in females; present also on metatarsus II in the male holotype of *P. utara* sp. n.); (2) cymbium with a long and narrow pointed apex (exception: *P. egregia* sp. n.) which corresponds to the short retrodorsal apical lobe on the cymbium in other paculline genera; (3) a small to large clypeal process in males (not in all species) and rarely a small clypeal hump in females; (4) sternal apophysis posteriorly wider than anteriorly, its posterior margin straight, concave or invaginated (see Lehtinen, 1981: fig. 12 and Schwendinger, 1989: figs 7, 13 for *Perania*, and Lehtinen, 1981: fig. 24 and Schwendinger, 1989: fig. 2 for *Sabahya* and *Lamania*, respectively); (5) anterior opisthosomal plate of females more or less strongly fragmented into microplates and more or less distinctly detached from pulmonary plate (exception: undescribed species from Brastagi); (6) dorsal opisthosomal plate of females reduced in size; (7) lateral opisthosomal plates completely fragmented into bands of microplates in both sexes of most species (remnants only found in males of *P. selatan* sp. n. and *P. deelemanae* sp. n.); (8) postgenital plate of females completely fragmented into microplates; (9) preanal plate of females largely or completely fragmented into microplates; (10) vulva with a pair of medially more or less distinctly fused ventral spermathecae carrying pores anteriorly and laterally; (11) vulva with a leathery anterior collar (= anterior part of cuticular uterus externus).

A characteristic feature of all *Perania* species is the presence of cowpat-shaped tubercles (see Schwendinger, 1994: fig. 4) on the "thoracic" portion of the carapace in males and females. These were also found in two species of *Paculla* (including the type species, *P. granulosa*), but not in *Sabahya* and *Lamania*. This points to a possible sister relationship between *Perania* and *Paculla*.

RELATIONSHIPS: Morphological characters (especially of copulatory organs) are good indicators of relationships within the species groups with more than two species, but without a phylogenetic analysis the relationships between the groups cannot be established with any degree of confidence. Within the *nigra*-group, *P. armata* and *P. nigra* differ from the other species by synapomorphic modifications in the "thoracic" portion of the carapace, and judging from similarities in palp morphology *P. korinchica* is very close to them. Genital morphology indicates that *P. deelemanae* sp. n. and *P. selatan* sp. n. are the closest relatives of the previous three species, together forming a subgroup. *Perania harau* sp. n. and *P. picea* form a second subgroup in the *nigra*-group.

Similarities in vulva morphology and geographical proximity indicate also two subgroups in the other relatively species-rich group, the *nasuta*-group: (1) *P. nasuta*, *P. nasicornis*, *P. tumida* sp. n. and *P. egregia* sp. n.; (2) *P. birmanica*, *P. ferox* sp. n. and *P. quadrifurcata* sp. n.

In the species on Sumatra one finds the greatest concentration of plesiomorphic charactes (see discussion on morphology) which indicates that they occupy a phylogenetically basal position within the genus. If so, then the *utara*-group and the *nigra*-group may not be more closely related to each other than each of them to one of the three species groups on the mainland.

BIOGEOGRAPHY AND HABITAT: The known range of *Perania* extends from southern China to southern Sumatra (Fig. 1). Sumatra appears to be the centre of species diversity and the cradle of *Perania*. Eight out of nineteen currently known species (plus an undescribed one) occur on this island; one or two undescribed species (known only from juveniles) are found on two small islands east of Sumatra. Further collecting in that region will almost certainly uncover further new species inside and outside the currently known range of the genus.

Two *Perania* species occur on Gunung Kerinci (the highest mountain of Sumatra) and they seem to be separated by altitude. The occurrence of even three *Perania* species on Gunung Singgalang, however, is doubtful. This would not only be highly unusual with regard to species diversity (only Gunung Kerinci and Gunung Singgalang have more than one recorded *Perania* species), but also because two of these three (*P. nigra* and *P. armata*) are sister species. Until new material from Gunung Singgalang confirms the presence of three *Perania* species there, I assume that the records of 1878 (all specimens collected by O. Beccari) are due to incorrect labelling.

The spiders collected by me come from various habitats: lowland and upland rainforests, evergreen hill forests, evergreen gallery forests, mixed evergreen-deciduous forests, fields near a newly cleared rain forest, the entrance of a cave and the dark zone of two other caves. These spiders were found on earthbanks at the sides of roads and paths, on banks of streams, under rotten wood and bark lying on the forest floor, under stones, and in cracks in limestone (inside and outside caves). The drier localities were all near streams (as were the populations in and outside caves), indicating that *Perania* avoids habitats with permanent or extended dry conditions.

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figure plates; John Hollier (MHNG) checked the English text. Christa L. Deeleman-Reinhold (Ossendrecht, The Netherlands) kindly reviewed the manuscript and gave valuable suggestions for improvement.

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